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MIDDLE FORK OF LITTLE BEAVER CREEK
MAHONING AND COLUMBIANA COUNTIES, OHIO
IMPACT ASSESSMENT REPORT

Prepared for:

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March 2000

Project No.: 933-6154

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March 31, 2000

Project No.: 933-6154

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RE: MIDDLE FORK OF LITTLE BEAVER CREEK, OHIO
IMPACT ASSESSMENT REPORT

Gentlemen:

On behalf of RÜTGERS Organics Corporation (ROC), we enclose a comprehensive report on the 1999 sampling activities in the Middle Fork of Little Beaver Creek, Mahoning and Columbiana Counties, Ohio.

This report integrates the work of ROC's consultant (Davey Resource Group) conducted pursuant to the Work Plan submitted on June 23, 1999, with parallel studies undertaken by the Ohio Environmental Protection Agency (OEPA) Division of Surface Water. Data from the 1999 studies are compared with previous results from the Remedial Investigation associated with the Nease Site, and prior studies by OEPA. In addition, the biocriteria measurements made by OEPA are evaluated in accordance with the *Biological Criteria for the Protection of Aquatic Life* (OEPA, 1988) and the Ohio Water Quality Standards.

As previously anticipated by the Agencies, we expect that the results of these sampling efforts will assist in focusing the upcoming Feasibility Study, and any potential remediation efforts envisaged, so that the maximum environmental benefit can be obtained while minimizing disruption to the ecosystem.

We look forward to discussing these results with you. If you should have any immediate questions, please do not hesitate to contact Dr. Rainer Domalski of ROC at 814-238-9200.

Very truly yours,

GOLDER ASSOCIATES INC.

P. Stephen Finn, C.Eng.
Principal

cc: Dr. Rainer Domalski, ROC
Ralph Pearce, P.E., ROC

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1.0 INTRODUCTION

This report presents the results of a 1999 survey of the Middle Fork of Little Beaver Creek (MFLBC) in Mahoning and Columbiana Counties, Ohio. The survey included assessment of the fish and benthic macroinvertebrate communities and habitats, together with chemical analysis of surface water, sediment and fish tissue. Results are compared to previous studies of the fish and benthic macroinvertebrate communities conducted by the Ohio Environmental Protection Agency (OEPA) in 1985 and 1987, and sediment and fish tissue chemical analyses undertaken on behalf of RÜTGERS Organics Corporation (ROC) in 1991. The 1999 survey was conducted jointly by OEPA and ROC, and combined the survey routinely undertaken by OEPA's Division of Surface Water, with chemical analysis required by the United States Environmental Protection Agency (USEPA) and OEPA (Agencies) in connection with the Remedial Investigation (RI) and Feasibility Study (FS) of the Nease Chemical Site, Salem, Ohio. As noted by the Agencies, the combined sampling effort "will assist in focusing the Feasibility Study and any potential remediation efforts envisaged so that the maximum environmental benefit can be obtained while minimizing the disruption to the ecosystem caused by the cleanup" (USEPA, 1999).

2.0 SCOPE OF 1999 INVESTIGATIONS

The scope of investigation was developed by the Agencies and ROC and included field surveys at fourteen locations throughout the length of the Creek (River Mile 1.9 to 40.3) with assessment of the following elements :

- Fish and benthic macroinvertebate communities, as indicated quantitatively by the Ohio Biological Criteria for the Protection of Aquatic Life (OEPA, 1988);
- Habitat conditions, based on field observations and summarized as OEPA's Qualitative Habitat Evaluation Index (QHEI);
- Recreational value of the fishery at each sample site based on the types, length and individual weight of fish species present;
- Fish tissue sampling according to OEPA's Fish Tissue Consumption Monitoring Program (FTCMP) protocol (OEPA, 1994) with laboratory analysis for mirex, photomirex and kepone;
- Sediment sampling with laboratory analysis for Target Compound List (TCL) volatile organic compounds (VOCs) semi-volatile organic compounds (SVOCs), pesticides, and polychlorinated biphenyls (PCBs), Target Analyte List (TAL) metals, mirex, photomirex and kepone, grain size and total organic carbon (TOC); and,
- Surface water sampling with field measurement of temperature, dissolved oxygen (DO), pH, total dissolved solids (TDS), conductivity and stream velocity, and laboratory analysis of Biological Oxygen Demand (BOD), total suspended solids (TSS) ammonia, nitrate, nitrite and phosphorous.

Field surveys were conducted jointly by biologists from OEPA and Davey Resource Group (Davey) consultants to ROC. All sample locations were agreed jointly in the field. OEPA had primary responsibility for collection of data for Biocriteria and QHEI Assessment, with Davey handling the remaining aspects of the survey. The field survey locations are illustrated in Figure 1 and summarized below:

River Mile	Description
40.3	Background: upstream of identifiable point source impacts
38.2	Upstream of Salem Wastewater Treatment Plant (WWTP), downstream of historical discharges on Buttermilk Creek
37.7	Immediately downstream of Salem WWTP, upstream of Nease
36.7	Upper low flow area of MFLBC, immediately downstream of Nease
33.3	Upper low flow area of MFLBC (Middletown Road/upstream crossing)
32.0	Higher flowing area before Egypt Swamp

River Mile	Description
28.8	Upper reach of Egypt Swamp
25.8	Lower reach of Egypt Swamp
23.5	Faster flowing segment
21.8	Upstream of East Branch Tributary
20.9	Downstream of East Branch Tributary
15.0	Forested ravine area above Lisbon Dam
4.4	Intermediate location below Lisbon Dam
1.9	Sediment deposition area

In addition to the above stations sampled by Davey, OEPA also collected biocriteria data from sites at River Miles 10.7. 10.0, 9 and 8.4.

A copy of the ROC Work Plan, previously approved by the Agencies, is provided as Appendix A. Deviations from this work plan were minor, necessitated by field conditions, and agreed with OEPA personnel (see Appendix B).

Complete descriptions of each sample site and photographs are provided in Appendix B.

3.0 RESULTS OF 1999 INVESTIGATION

3.1 Ohio Biocriteria

OEPA utilizes three biocriteria for the assessment of the aquatic health of streams and waterbodies:

- Invertebrate Community Index (ICI) which assesses benthic macroinvertebrate communities via ten structural and functional community metrics. Artificial substrate samplers are utilized to collect data for nine of the metrics and so substrate differences do not substantially impact the results;
- Modified Index of Well-Being (Modified I_{wb}) which assesses the structural attributes of the fish community via the numbers, biomass, and diversity of fish species. In calculating the Modified I_{wb}, the numbers and biomass of highly pollution tolerant species are eliminated to improve the sensitivity of the index to environmental stress; and,
- Index of Biotic Integrity (IBI) which assesses the functional characteristics of the fish community via twelve metrics covering species richness and composition, trophic composition, fish abundance and condition.

As noted by OEPA(1988) the IBI and Modified I_{wb} taken together "provide a rigorous evaluation of overall fish community condition." Artificial substrate samplers for ICI data collection were deployed in June and recovered in September 1999. Two rounds of fish data were collected by OEPA during the June and September fieldwork.

The raw data for ICI, Modified I_{wb} and IBI biocriteria are provided in Appendix C and the resulting indices are presented graphically in Figures 2 through 4. The graphical depictions also include the comparable data from OEPA's 1985 and 1987 studies, and the criteria values for the designated uses of each section of the creek in accordance with OAC 3745-1-07-5 Table 7-14 together with the associated ranges of insignificant departure (OEPA, 1988).

3.2 Habitat Evaluation

OEPA evaluates the macro-habitat for fish by means of the Qualitative Habitat Evaluation Index (QHEI) which is based on substrate type, amount and type of instream cover, channel morphology development and stability, riparian zone width and composition, pool and riffle-run quality, gradient, and drainage area. The raw data from OEPA's assessment is provided in Appendix C, and QHEI data are presented graphically in Figure 5, together with the comparable data from OEPA's 1985 study. The range of data from unpolluted Ohio streams is also presented

in Figure 5 for comparison purposes. Target QHEI values are not designated in Ohio regulations, rather the data are used in interpreting the biocriteria results (OEPA, 1988).

The results of Davey's assessment of the Recreational Value of the Fishery at each sampling site are detailed in Appendix B and generally indicate ideal conditions in the lower reaches of the Creek with unsuitable to marginal conditions towards the headwaters. In addition to the effects of erosion, sedimentation, channelization and dredging (which are reflected in the QHEI) Davey also noted the fact that the Lisbon Dam constitutes a physical barrier to fish migration. This likely explains the absence of certain species, such as smallmouth bass, above the Lisbon Dam, in spite of the existence of suitable habitat.

3.3 Fish Tissue

Samples of edible fish tissue were collected in accordance with OEPA protocol and analyzed for mirex, photomirex and kepone by Centre Analytical Laboratories (CAL), the laboratory approved by the Agencies for the RI/FS. Davey and OEPA selected individual specimens for tissue sampling in the field. In a few instances (River Miles 20.9, 23.5, 25.8 and 37.7) consensus was not achieved concerning which species and individuals should be sampled to reflect those which would be preferable to anglers; in these situations, two samples were collected to accommodate the best professional judgement of both OEPA and Davey biologists.

Laboratory analytical data was validated by Golder Associates (see Appendix D) and the validated data are summarized in Table 1. Photomirex was detected in only one sample, and kepone was not detected in any of the samples. Mirex data for the specimens selected by Davey is presented graphically in Figure 6 and the comparable data from 1991 is presented in the same format in Figure 7. Most notable is the fact that fish tissue concentrations are significantly lower than in 1991, with the large majority of the current data below the FDA Advisory Level of 100 ppb.

3.4 Sediment

Sediment samples were analyzed by CAL with data validation performed by Golder Associates (see Appendix D). Pesticides (other than mirex) and PCBs were not detected, and VOC and SVOC constituents were detected very sporadically at low concentrations (see Tables 2 through 5). Metals were detected in all samples but with no discernable spatial trend that could be related

to the Nease Site (see Table 6). Metals concentrations do not exceed typical screening levels (OMOE, 1993) upstream of River Mile 25.8; below this point, exceedances may relate to coal mining/production operations, steel fabricators and other dischargers to the MFLBC. Validated data for mirex, photomirex and kepone are presented in Table 7 together with total organic carbon (TOC), percent fines, and percent solids. Photomirex was detected in only one duplicate sample (but was not present in the corresponding primary sample) and kepone was not detected in any of the samples. The mirex data are presented graphically in Figure 8. Sediment mirex data from earlier RI/FS studies are presented in the same format in Figure 9. Again, the most notable feature in the data is that concentrations are much lower than in previous sampling, and this is probably reflective of natural burial of contaminated sediment.

3.5 Surface Water

Surface water data are summarized in Table 8. The most notable feature in this data is the marked effect of the Salem Wastewater Treatment Plant (WWTP) discharge just upstream of River Mile 37.7. Total dissolved solids, conductivity, nitrate, phosphorus and dissolved oxygen all show significant impacts at this location (which is upstream of discharges linked to the Nease site) and these impacts extend a significant distance downstream. Field notes taken by OEPA personnel also indicated "sewage odor in stream and sludge deposits along stream margin" at River Mile 37.7 and "minor sludge deposits along margins" at River Mile 36.7. These observations are consistent with OEPA's conclusions from earlier assessments that identified the most severe impacts as immediately downstream of the Salem WWTP with data "strongly suggesting sewage enrichment"[1] (OEPA, 1991).

[1] OEPA (1991) also drew attention to "an unusual proportion of deformities" downstream of Nease Chemical that were thought not to be associated with municipal sludge impacts. The recent data indicates that a very small numbers of fish deformities are now present.

4.0 IMPACT ASSESSMENT

The following sections provide a synthesis of the historical and current biological and chemical data for the MFLBC so as to provide an overall assessment of the biological health of the stream. In addition, an updated assessment of the associated food chain risks and human health risks is provided in summary form for the purposes of the forthcoming Feasibility Study in connection with the Nease Site.

4.1 Stream Biological Health

Comparison of the biocriteria results for 1985 and 1999 (Figure 2) indicates a marked improvement in benthic macroinvertebrates immediately downstream of the Salem WWTP and the Nease Site (River Mile 37.7 and 36.7). These changes likely result from improvements to the WWTP operations, as well as continued controls on the Nease Site. Invertebrate data at other sites as well as the fish community indices (Figures 3 & 4) show some general improvement since 1985. Current habitat conditions, as measured by the QHEI, are best characterized as similar to 1985.

OEPA has designated the use of the MFLBC in three sections:

- "Warmwater Habitat (WWH) – Headwater Methodology" to approximately River Mile 31.5;
- "Warmwater Habitat (WWH) – Wading Methodology" between River Miles 31.5 and 12.5; and,
- "Exceptional Warmwater Habitat (EWH) – Wading Methodology" between River Mile 12.5 and the mouth.

In comparing the biocriteria to the designated use values specified in Table 14 of OAC 3745-1-07-5 it is important to note the following:

- Designated uses are based upon the assessed capability of a stream to theoretically attain the use. As noted by OEPA (1988) "only one of the three biological indices need demonstrate attainment...outside of any areas of chemical degradation" for use *designation.* Thus it is possible for a stream to not attain all of the criteria in the absence of *any* chemical contamination. As a result, a finding of non-attainment requires a failure of *all* indices to meet the applicable criterion (OEPA, 1988);

- OEPA (1988) has recognized that there is a statistical "range of insignificant departure" from regulated values. These ranges are indicated on Figures 2 through 4, and values within these ranges are deemed to attain the designated use; and,

- In order to designate WWH, QHEI values must exceed the 25th percentile value for WWH reference sites in the ecoregion (QHEI>70 for wading sites). Likewise, QHEI scores less than the 75th percentile value for Modified Warmwater Habitat (MWH) reference sites (QHEI<55 for wading sites) are an indication that WWH may not be attainable (OEPA, 1988).

4.1.1 WWH-Headwater

Biocriteria values for headwater sites are limited to ICI and IBI, due to the extreme influence of drainage area on I_{wb}. As noted previously, ICI values immediately downstream of the Salem WWTP have shown marked improvement since 1985, although the designated use value remains unattained at River Mile 37.7, closest to the WWTP discharge. The ICI and IBI values measured in the extreme headwaters at River Mile 40.3 also do not attain the designated use values, although this is likely habitat related and, due to their upstream location, cannot be influenced by the Nease site. Designated use values of IBI are not attained at River Miles 37.7 (just downstream of the Salem WWTP) and 36.7 (downstream of Salem WWTP and the Nease Site). In this case, the influence of the Salem WWTP appears most significant, since the mirex concentration at River Mile 37.7 is very low (21.2 ppb) and the concentration at River Mile 36.7 (442 ppb) although higher, does not exceed the conservative screening level of 480 ppb established in the Endangerment Assessment (ENVIRON/Weinberg, 1999).

4.1.2 WWH-Wading

Within this section of the MFLBC, ICI values attain the designated use in all but one location (River Mile 20.9). Both of the Fish criteria, however, do not attain the designated use at River Miles 25.8 and 28.8 within the area known as Egypt Swamp. However, it is significant to note that at all three of these partial attainment locations, the habitat is significantly affected by channelization as indicated by the QHEI values. In all cases, the QHEI data indicate that WWH may not be attainable (QHEI<55)[2]. The partial attainment therefore likely reflects habitat conditions, and is unrelated to the Nease Site.

[2] Conditions appear to represent an "irretrievable anthropogenic modification" since the gradient is <5 ft/mile in all cases, which likely precludes stream recovery according to OEPA (1989).

4.1.3 EWH-Wading

Within this section of the MFLBC, both of the fish biocriteria attain the designated use values at all locations in at least one of the 1999 samples. In three cases (River Miles 4.4, 9, and 10.7) the macroinvertebrate criteria are not attained. Mirex was, however, only detected in one primary sample at a very low concentration and was not detected in associated field duplicate sample. This indicates that there has been no significant downstream transport of mirex in sediments since 1991. Overall, the designated use of this portion of the MFLBC is only partially attained; however, the lack of attainment cannot be related to the Nease Site.

4.2 Food Chain Risks

The Endangerment Assessment (ENVIRON/Weinberg, 1999) included a comprehensive assessment of food chain risks to wildlife species exposed to the MFLBC. The only aquatic or semi-aquatic receptor for which a Hazard Quotient exceeding unity was calculated, was mink close to the Nease site. In this case, the Hazard Quotient was 2.5, based on a whole-body fish concentration for mirex of 1540 ppb. Although, whole-body samples were not collected in 1999, it is reasonable to assume that the ratio of whole-body to edible fish tissue concentration would be approximately the same in the 1991 and 1999 sampling events. Analysis of the 1991 data indicates a whole-body to edible ratio of between 1.4 and 2.7. Taking the higher ratio (to be conservative) in conjunction with the average edible concentration of 170 ppb[3], indicates an equivalent 1999 whole-body fish concentration of approximately 459 ppb. Since, in this case, the Hazard Quotient is directly proportional to mirex concentration, a revised Hazard Quotient of 0.7 is estimated based on the current data, indicating no significant ecological risk.

4.3 Human Health Risks

Human health risks due to fish ingestion upstream of Lisbon Dam were estimated at 9.9×10^{-5} (Reasonable Maximum) and 9.5×10^{-6} (Central Tendency) in the Endangerment Assessment (ENVIRON/Weinberg, 1999). These values were calculated based on an edible fish tissue Reasonable Maximum Exposure of 1270 ppb. The new data indicate a comparable edible fish tissue RME of 115 ppb, which in turn results in revised risk estimates of 9.0×10^{-6} (Reasonable Maximum) and 8.6×10^{-7} (Central Tendency).

[3] Average concentration for Reach 1 (upstream of River Mile 25.8).

5.0 CONCLUSIONS

The 1999 survey of MFLBC indicates significant improvement in the biological health of the aquatic system since previous sampling in 1985 and 1987. Remaining areas where the State's Designated Use criteria are only partially attained appear to be largely habitat related and not associated with mirex from the Nease Site. Mirex concentrations in fish tissue and sediment are also significantly lower than in previous sampling in 1991. As a result, estimated food chain risks to aquatic and semi-aquatic wildlife receptors are not expected to be significant. The large majority of edible fish tissue data no longer exceeds the FDA Advisory Level for mirex, and risks to human health are correspondingly lower than previously predicted. As anticipated by the Agencies, the upcoming Feasibility Study will utilize these data in focusing the Remedial Action Objectives and evaluating Remedial Alternatives for the MFLBC stream channel.

6.0 REFERENCES

ENVIRON/Weinberg, 1999. Endangerment Assessment for the Nease Chemical Company Site, Salem, Ohio, June 1999.

Ohio Environmental Protection Agency (see OEPA)

OEPA, 1988. Biological Criteria for the Protection of Aquatic Life: Volumes I, II, and III.

OEPA, 1989. The Qualitative Habitat Evaluation Index (QHEI): Rationale, Methods and Application.

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OEPA, 1994. Fish Tissue Monitoring Program Guidance Manual: MAS/1994-11-1.

Ontario Ministry of Environment, 1993. Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario.

U.S. Environmental Protection Agency (see USEPA)

USEPA, 1999. Letter from USEPA and OEPA to RÜTGERS Organics Corporation dated February 3, 1999.

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Table 1
MPK Data Summary for Fish Tissue Samples
MFLBC July, 1999
RÜTGERS Organics Corporation

Lab ID	Matrix	Sample ID	Fish Type	Mirex Result	Mirex Qualifier	Photomirex Result	Photomirex Qualifier	Kepone Result	Kepone Qualifier
L23745-4	Fish	FT 383	Yellow Bullhead	*23.9*	*J*	ND	U	ND	U
L23768-2	Fish	FT 378-A	Yellow Bullhead	*60.9*	*N*	ND	U	ND	U
L23768-3	Fish	FT 378-B	White Sucker	ND	U	ND	U	ND	U
L23768-4	Fish	FT 367	White Sucker	*133.0*	*N*	ND	U	ND	U
L23769-2	Fish	FT 333	Carp	*378.4*	*N*	*31.3*	*J*	ND	U
L23778-1	Fish	FT 320	White Sucker	*54.8*	*J*	ND	U	ND	U
L23778-3	Fish	FT 288	Carp	*320.4*	*N*	ND	U	ND	U
L23777-2	Fish	FT 258-A	Carp	*470.6*	*N*	ND	U	ND	U
L23777-3	Fish	FT 258-B	White Sucker	*56.9*	*N*	ND	U	ND	U
L23789-2	Fish	FT 235A	Carp	*450.8*	*N*	ND	U	ND	U
L23789-3	Fish	FT 235B	Bluegill	*144.5*	*N*	ND	U	ND	U
L23815-1	Fish	FT 218	Rock Bass	*251.3*	*N*	ND	U	ND	U
L23815-3	Fish	FT 209-A	Largemouth Bass	ND	U	ND	U	ND	U
L23815-4	Fish	FT 209-B	Bluegill	*31.4*	*J*	ND	U	ND	U
L23885-3	Fish	FT 150	White Sucker	ND	U	ND	U	ND	U
L23885-5	Fish	FT 50	Smallmouth Bass	ND	U	ND	U	ND	U
L23885-4	Fish	FT 19B	Channel Cat	ND	U	ND	U	ND	U
L23913-6	Fish	FT 19A	Smallmouth Bass	ND	U	ND	U	ND	U

All units are in ug/kg (ppb).
Qualifiers are defined as follows:

U = Analyte not detected Reporting limits - Mirex: 52.7 - 60 ppb; Photomirex: 57.8 - 66.1 ppb; Kepone: 187 - 214 ppb.

J = Analyte detected at a concentration below the sample reporting limit.

N = tentatively Identified. Analyte presence strongly indicated but ion abundance ratio criteria are not met. This may be due to sample matrix effects.

Table 2
Pesticide Data Summary for Sediment Samples
MFLBC July, 1999
RÜTGERS Organics Corporation

Parameter	SD19 [ug/kg]	SD45 [ug/kg]	SD54 [ug/kg]	SD150 [ug/kg]	SD105 [ug/kg]	SD209 [ug/kg]	SD218 [ug/kg]	SD235 [ug/kg]	SD258 [ug/kg]	SD852 [ug/kg]
4,4'-DDD	0.92 U	1 U	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
4,4'-DDE	0.92 U	1 U	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
4,4'-DDT	0.92 U	1 U	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
aldrin	0.92 U	1 U	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
alpha-BHC	0.92 U	1 U	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
beta-BHC	0.92 U	1 U	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
Chlordane	46 U	52 U	55 U	58 U	44 U	53 U	71 U	55 U	60 U	60 U
delta-BHC	0.92 U	1 U	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
Dieldrin	0.92 U	1 U	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
Endosulfan I	0.92 U	1 U	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
Endosulfan II	0.92 U	1 U	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
Endosulfan Sulfate	0.92 U	1 U	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
Endrin	0.92 U	1 U	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
Endrin Aldehyde	0.92 U	1 U	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
Endrin Ketone	0.92 U	1 U	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
gamma-BHC	0.92 U	1 U	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
Hepatchlor	0.92 U	1 U	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
Hepatchlor Epoxide	0.92 U	1 U	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
Methoxychlor	0.92 U	1 U	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
Toxaphene	46 U	52 U	55 U	58 U	44 U	53 U	71 U	55 U	60 U	60 U

Table 2
Pesticide Data Summary for Sediment Samples
MFLBC July, 1999
RÜTGERS Organics Corporation

Parameter	SD288 [ug/kg]	SD320 [ug/kg]	SD333 [ug/kg]	SD367 [ug/kg]	SD763 [ug/kg]	SD378 [ug/kg]	SD383 [ug/kg]	SD838 [ug/kg]	SD403 [ug/kg]
4,4'-DDD	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
4,4'-DDE	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
4,4'-DDT	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
aldrin	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
alpha-BHC	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
beta-BHC	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Chlordane	45 U	41 U	47 U	43 U	41 U	43 U	41 U	41 U	40 U
delta-BHC	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Dieldrin	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Endosulfan I	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Endosulfan II	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Endosulfan Sulfate	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Endrin	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Endrin Aldehyde	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Endrin Ketone	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
gamma-BHC	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Hepatchlor	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Hepatchlor Epoxide	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Methoxychlor	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Toxaphene	45 U	41 U	47 U	43 U	41 U	43 U	41 U	41 U	40 U

SD54 is the field duplicate of SD45.
SD852 is the field duplicate of SD258.
SD763 is the field duplicate of SD367.
SD838 is the field duplicate of SD383.

Table 3
Polychlorinated Biphenyls (PCB) Data Summary for Sediment Samples
MFLBC July, 1999
RÜTGERS Organics Corporation

Parameter	SD19 [ug/kg]	SD45 [ug/kg]	SD54 [ug/kg]	SD150 [ug/kg]	SD105 [ug/kg]	SD209 [ug/kg]	SD218 [ug/kg]	SD235 [ug/kg]	SD258 [ug/kg]	SD852 [ug/kg]
AROCLOR-1016/1242	46 U	52 U	55 U	58 U	44 U	53 U	71 U	55 U	60 U	60 U
AROCLOR-1221	46 U	52 U	55 U	58 U	44 U	53 U	71 U	55 U	60 U	60 U
AROCLOR-1232	46 U	52 U	55 U	58 U	44 U	53 U	71 U	55 U	60 U	60 U
AROCLOR-1248	46 U	52 U	55 U	58 U	44 U	53 U	71 U	55 U	60 U	60 U
AROCLOR-1254	46 U	52 U	55 U	58 U	44 U	53 U	71 U	55 U	60 U	60 U
AROCLOR-1260	46 U	52 U	55 U	58 U	44 U	53 U	71 U	55 U	60 U	60 U

Parameter	SD288 [ug/kg]	SD320 [ug/kg]	SD333 [ug/kg]	SD367 [ug/kg]	SD763 [ug/kg]	SD378 [ug/kg]	SD383 [ug/kg]	SD838 [ug/kg]	SD403 [ug/kg]
AROCLOR-1016/1242	45 U	41 U	47 U	43 U	41 U	43 U	41 U	41 U	40 U
AROCLOR-1221	45 U	41 U	47 U	43 U	41 U	43 U	41 U	41 U	40 U
AROCLOR-1232	45 U	41 U	47 U	43 U	41 U	43 U	41 U	41 U	40 U
AROCLOR-1248	45 U	41 U	47 U	43 U	41 U	43 U	41 U	41 U	40 U
AROCLOR-1254	45 U	41 U	47 U	43 U	41 U	43 U	41 U	41 U	40 U
AROCLOR-1260	45 U	41 U	47 U	43 U	41 U	43 U	41 U	41 U	40 U

SD54 is the field duplicate of SD45.
SD852 is the field duplicate of SD258.
SD763 is the field duplicate of SD367.
SD838 is the field duplicate of SD383.

Table 4
Volatile Organic Data Summary for Sediment Samples
MFLBC July, 1999
RÜTGERS Organics Corporation

Parameter	SD19 [ug/kg]	SD45 [ug/kg]	SD54 [ug/kg]	SD150 [ug/kg]	SD105 [ug/kg]	SD209 [ug/kg]	SD218 [ug/kg]	SD235 [ug/kg]	SD258 [ug/kg]	SD852 [ug/kg]
1,1,1-Trichloroethane	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
1,1,2,2-Tetrachloroethane	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
1,1,2-Trichloroethane	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
1,1-Dichloroethene	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
1,2,4-Trichlorobenzene	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
1,2-Dibromo-3-Chloropropane	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
1,2-Dibromoethane	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
1,2-Dichlorobenzene	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
1,2-Dichloroethane	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
1,2-Dichloropropane	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
1,3-Dichlorobenzene	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
1,4-Dichlorobenzene	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
2-Butanone	12 U	22 U	17 U	13 U	14 U	21 U	27 U	16 U	68 U	43 U
2-Hexanone	12 U	15 U	17 U	13 U	14 U	16 U	21 U	16 U	19 U	18 U
4-Methyl-2-Pentanone	12 U	15 U	17 U	13 U	14 U	16 U	21 U	16 U	19 U	18 U
Acetone	34 U	100 U	51 U	29 U	46 U	92 U	97 U	16 U	350	210 U
Benzene	6 U	8 U	9 U	6 U	7 U	8 U	4 J	8 U	10 U	9 U
Bromochloromethane	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
Bromodichloromethane	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
Bromoform	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
Bromomethane	12 U	15 U	17 U	13 U	14 U	16 U	21 U	16 U	19 U	18 U
Carbon Disulfide	6 U	12 U	10 U	17 U	14 U	14 U	25	8 U	38	27
Carbon Tetrachloride	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
Chlorobenzene	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
Chloroethane	12 U	15 U	17 U	13 U	14 U	16 U	21 U	16 U	19 U	18 U
Chloroform	11 U	10 U	14 U	17 U	20 U	25 U	18 U	18 U	14 U	24 U
Chloromethane	12 U	15 U	17 U	13 U	14 U	16 U	21 U	16 U	19 U	18 U
cis-1,2-Dichloroethene	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
cis-1,3-Dichloropropene	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
Dibromochloromethane	6 U	8 U	9 U	6 U	7 U	2 J	10 U	8 U	10 U	9 U
Dichloromethane	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
Ethylbenzene	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
m,p-Xylene	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
o-Xylene	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
Styrene	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
Tetrachloroethene	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
Toluene	6 U	9	15	6 U	7 U	8 U	3 J	8 U	10 U	9 U
trans-1,2-Dichloroethene	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
trans-1,3-Dichloropropene	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
Trichloroethene	6 U	8 U	9 U	6 U	7 U	8 U	10 U	8 U	10 U	9 U
Vinyl Chloride	12 U	15 U	17 U	13 U	14 U	16 U	21 U	16 U	19 U	18 U

Table 4
Volatile Organic Data Summary for Sediment Samples
MFLBC July, 1999
RÜTGERS Organics Corporation

Parameter	SD288 [ug/kg]	SD320 [ug/kg]	SD333 [ug/kg]	SD367 [ug/kg]	SD763 [ug/kg]	SD378 [ug/kg]	SD383 [ug/kg]	SD838 [ug/kg]	SD403 [ug/kg]
1,1,1-Trichloroethane	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
1,1,2,2-Tetrachloroethane	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
1,1,2-Trichloroethane	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
1,1-Dichloroethene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
1,2,4-Trichlorobenzene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
1,2-Dibromo-3-Chloropropane	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
1,2-Dibromoethane	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
1,2-Dichlorobenzene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
1,2-Dichloroethane	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
1,2-Dichloropropane	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
1,3-Dichlorobenzene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
1,4-Dichlorobenzene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
2-Butanone	27 U	13 U	17 U	18 U	15 U	14 U	15 U	17 U	29 U
2-Hexanone	14 U	13 U	15 U	13 U	13 U	13 U	12 U	13 U	13 U
4-Methyl-2-Pentanone	14 U	13 U	15 U	13 U	13 U	13 U	12 U	13 U	13 U
Acetone	94 U	26 U	49 U	60 U	29 U	26 U	30 U	23 U	76 U
Benzene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Bromochloromethane	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Bromodichloromethane	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Bromoform	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Bromomethane	14 U	13 U	15 U	13 U	13 U	13 U	12 U	13 U	13 U
Carbon Disulfide	8 U	6 U	7 U	7 U	6 U	7 U	8 U	7 U	17
Carbon Tetrachloride	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Chlorobenzene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Chloroethane	14 U	13 U	15 U	13 U	13 U	13 U	12 U	13 U	13 U
Chloroform	22 U	13 U	10 U	15 U	15 U	13 U	23 U	22 U	12 U
Chloromethane	14 U	13 U	15 U	13 U	13 U	13 U	12 U	13 U	13 U
cis-1,2-Dichloroethene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
cis-1,3-Dichloropropene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Dibromochloromethane	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Dichloromethane	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Ethylbenzene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
m,p-Xylene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
o-Xylene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Styrene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Tetrachloroethene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Toluene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
trans-1,2-Dichloroethene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
trans-1,3-Dichloropropene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Trichloroethene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Vinyl Chloride	14 U	13 U	15 U	13 U	13 U	13 U	12 U	13 U	13 U

SD54 is the field duplicate of SD45.
SD852 is the field duplicate of SD258.
SD763 is the field duplicate of SD367.
SD838 is the field duplicate of SD383.

Table 5
Semi-Volatile Organic Data Summary for Sediment Samples
MFLBC July, 1999
RÜTGERS Organics Corporation

Parameter	SD19 [ug/kg]	SD45 [ug/kg]	SD54 [ug/kg]	SD150 [ug/kg]	SD105 [ug/kg]	SD209 [ug/kg]	SD218 [ug/kg]	SD235 [ug/kg]	SD258 [ug/kg]	SD852 [ug/kg]
1,2,4-Trichlorobenzene	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
1,2-Dichlorobenzene	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
1,3-Dichlorobenzene	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
1,4-Dichlorobenzene	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
2,4,5-Trichlorophenol	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
2,4,6-Trichlorophenol	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
2,4-Dichlorophenol	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
2,4-Dimethylphenol	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
2,4-Dinitrophenol	910 U	1000 U	1100 U	1200 U	880 U	1100 U	710 U	1100 U	1200 U	1200 U
2,4-Dinitrotoluene	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
2,6-Dinitrotoluene	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
2-Chloronaphthalene	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
2-Chlorophenol	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
2-Methyl-4,6-Dinitrophenol	1100 U	1300 U	1400 U	1500 U	1100 U	1400 U	1800 U	1360 U	1500 U	1500 U
2-Methylnaphthalene	240 J	520 U	550 U	200 J	140 J	96 J	160 J	540 U	590 U	610 U
2-Methylphenol	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
2-Nitroaniline	910 U	1000 U	1100 U	1200 U	880 U	1100 U	1400 U	1100 U	1200 U	1200 U
2-Nitrophenol	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
3&4-Methylphenol	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
3,3'-Dichlorobenzidine	1100 U	1300 U	1400 U	1500 U	1100 U	1400 U	1800 U	1360 U	1500 U	1500 U
3-Nitroaniline	910 U	1000 U	1100 U	1200 U	880 U	1100 U	1400 U	1100 U	1200 U	1200 U
4-Bromophenyl Phenyl Ether	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
4-Chloro-3-Methylphenol	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
4-Chloroaniline	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
4-Chlorophenyl Phenyl Ether	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
4-Nitroaniline	910 U	1000 U	1100 U	1200 U	880 U	1100 U	1400 U	1100 U	1200 U	1200 U
4-Nitrophenol	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
Acenaphthene	450 U	520 U	550 U	590 U	440 U	180 J	710 U	540 U	590 U	610 U
Acenaphthylene	450 U	520 U	550 U	590 U	440 U	61 J	710 U	540 U	590 U	610 U
Anthracene	450 U	520 U	550 U	590 U	440 U	460 J	710 U	540 U	590 U	610 U
Benzo(a)anthracene	450 U	520 U	550 U	590 U	56 J	1100	710 U	540 U	590 U	610 U
Benzo(a)pyrene	450 U	520 U	550 U	70 J	110 J	1500	710 U	540 U	590 U	610 U
Benzo(b)fluoranthene	450 U	520 U	550 U	89 J	100 J	1200	710 U	540 U	590 U	610 U
Benzo(g,h,i)perylene	450 U	520 U	550 U	68 J	93 J	850	710 U	540 U	590 U	610 U
Benzo(k)fluoranthene	450 U	520 U	550 U	74 J	100 J	1400	710 U	540 U	590 U	610 U

Table 5
Semi-Volatile Organic Data Summary for Sediment Samples
MFLBC July, 1999
RÜTGERS Organics Corporation

Parameter	SD19 [ug/kg]	SD45 [ug/kg]	SD54 [ug/kg]	SD150 [ug/kg]	SD105 [ug/kg]	SD209 [ug/kg]	SD218 [ug/kg]	SD235 [ug/kg]	SD258 [ug/kg]	SD852 [ug/kg]
Benzoic Acid	910 U	1000 U	1100 U	1200 U	880 U	1100 U	1400 U	1100 U	1200 U	1200 U
Benzyl Alcohol	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
bis(2-Chloroethoxy)methane	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
bis(2-Chloroethyl)ether	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
bis(2-Chloroisopropyl)ether	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
bis(2-Ethylhexyl) phthalate	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
Butylbenzyl phthalate	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
Chrysene	51 J	520 U	550 U	69 J	72 J	1100	710 U	540 U	590 U	610 U
Dibenz(a,h)anthracene	450 U	520 U	550 U	590 U	440 U	240 J	710 U	540 U	590 U	610 U
Dibenzofuran	61 J	520 U	550 U	590 U	440 U	89 J	710 U	540 U	590 U	610 U
Diethyl phthalate	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
Dimethyl phthalate	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
Di-n-butyl phthalate	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
Di-n-octyl phthalate	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
Fluoranthene	86 J	520 U	550 U	92 J	130 J	2300	710 U	540 U	590 U	610 U
Fluorene	450 U	520 U	550 U	590 U	440 U	230 J	710 U	540 U	590 U	610 U
Hexachlorobenzene	450 U	520 U	550 U	590 U	440 U	260 J	710 U	540 U	590 U	610 U
Hexachlorobutadiene	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
Hexachlorocyclopentadiene	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
Hexachloroethane	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
Indeno(1,2,3-cd)pyrene	450 U	520 U	550 U	590 U	77 J	810	710 U	540 U	590 U	610 U
Isophorone	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
Naphthalene	160 J	520 U	550 U	130 J	92 J	78 J	710 U	540 U	590 U	610 U
Nitrobenzene	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
N-Nitroso-di-n-propylamine	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
N-Nitrosodiphenylamine	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
Pentachlorophenol	910 U	1000 U	1100 U	1200 U	880 U	1100 U	710 U	1100 U	1200 U	1200 U
Phenanthrene	180 J	520 U	550 U	150 J	140 J	1600	710 U	540 U	590 U	610 U
Phenol	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
Pyrene	79 J	520 U	550 U	110 J	130 J	2500	710 U	540 U	590 U	610 U

SD54 is the field duplicate of SD45.
SD852 is the field duplicate of SD258.
SD763 is the field duplicate of SD367.
SD838 is the field duplicate of SD383.

Table 5
Semi-Volatile Organic Data Summary for Sediment Samples
MFLBC July, 1999
RÜTGERS Organics Corporation

Parameter	SD288 [ug/kg]	SD320 [ug/kg]	SD333 [ug/kg]	SD367 [ug/kg]	SD763 [ug/kg]	SD378 [ug/kg]	SD383 [ug/kg]	SD838 [ug/kg]	SD403 [ug/kg]
1,2,4-Trichlorobenzene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
1,2-Dichlorobenzene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
1,3-Dichlorobenzene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
1,4-Dichlorobenzene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
2,4,5-Trichlorophenol	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
2,4,6-Trichlorophenol	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
2,4-Dichlorophenol	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
2,4-Dimethylphenol	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
2,4-Dinitrophenol	890 U	800 U	940 U	870 U	810 U	850 U	830 U	820 U	810 U
2,4-Dinitrotoluene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
2,6-Dinitrotoluene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
2-Chloronaphthalene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
2-Chlorophenol	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
2-Methyl-4,6-Dinitrophenol	1100 U	1000 U	1200 U	1100 U	1000 U	1100 U	1000 U	1000 U	1000 U
2-Methylnaphthalene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
2-Methylphenol	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
2-Nitroaniline	890 U	800 U	940 U	870 U	810 U	850 U	830 U	820 U	810 U
2-Nitrophenol	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
3&4-Methylphenol	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
3,3'-Dichlorobenzidine	1100 U	1000 U	1200 U	1100 U	1000 U	1100 U	1000 U	1000 U	1000 U
3-Nitroaniline	890 U	800 U	940 U	870 U	810 U	850 U	830 U	820 U	810 U
4-Bromophenyl Phenyl Ether	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
4-Chloro-3-Methylphenol	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
4-Chloroaniline	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
4-Chlorophenyl Phenyl Ether	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
4-Nitroaniline	890 U	800 U	940 U	870 U	810 U	850 U	830 U	820 U	810 U
4-Nitrophenol	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Acenaphthene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Acenaphthylene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Anthracene	450 U	400 U	470 U	440 U	410 U	430 U	70 J	110 J	410 U
Benzo(a)anthracene	450 U	400 U	470 U	440 U	410 U	430 U	190 J	170 J	410 U
Benzo(a)pyrene	450 U	400 U	470 U	440 U	410 U	430 U	200 J	170 J	410 U
Benzo(b)fluoranthene	450 U	400 U	470 U	440 U	410 U	430 U	200 J	150 J	410 U
Benzo(g,h,i)perylene	450 U	400 U	470 U	440 U	410 U	430 U	140 J	110 J	410 U
Benzo(k)fluoranthene	450 U	400 U	470 U	440 U	410 U	430 U	200 J	160 J	410 U

Table 5
Semi-Volatile Organic Data Summary for Sediment Samples
MFLBC July, 1999
RÜTGERS Organics Corporation

Parameter	SD288 [ug/kg]	SD320 [ug/kg]	SD333 [ug/kg]	SD367 [ug/kg]	SD763 [ug/kg]	SD378 [ug/kg]	SD383 [ug/kg]	SD838 [ug/kg]	SD403 [ug/kg]
Benzoic Acid	890 U	800 U	940 U	870 U	810 U	850 U	830 U	820 U	810 U
Benzyl Alcohol	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
bis(2-Chloroethoxy)methane	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
bis(2-Chloroethyl)ether	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
bis(2-Chloroisopropyl)ether	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
bis(2-Ethylhexyl) phthalate	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Butylbenzyl phthalate	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Chrysene	450 U	400 U	470 U	440 U	410 U	430 U	200 J	180 J	410 U
Dibenz(a,h)anthracene	450 U	400 U	470 U	440 U	410 U	430 U	49 J	410 U	410 U
Dibenzofuran	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Diethyl phthalate	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Dimethyl phthalate	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Di-n-butyl phthalate	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Di-n-octyl phthalate	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Fluoranthene	450 U	400 U	470 U	61 J	66 J	430 U	450	450	410 U
Fluorene	450 U	400 U	470 U	440 U	410 U	430 U	45 J	410 U	410 U
Hexachlorobenzene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Hexachlorobutadiene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Hexachlorocyclopentadiene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Hexachloroethane	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Indeno(1,2,3-cd)pyrene	450 U	400 U	470 U	440 U	410 U	430 U	110 J	100 J	410 U
Isophorone	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Naphthalene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Nitrobenzene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
N-Nitroso-di-n-propylamine	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
N-Nitrosodiphenylamine	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Pentachlorophenol	890 U	800 U	940 U	870 U	810 U	850 U	830 U	820 U	810 U
Phenanthrene	450 U	400 U	470 U	440 U	42 J	430 U	360 J	340 J	410 U
Phenol	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Pyrene	450 U	400 U	470 U	51 J	53 J	430 U	380 J	360 J	410 U

SD54 is the field duplicate of SD45.
SD852 is the field duplicate of SD258.
SD763 is the field duplicate of SD367.
SD838 is the field duplicate of SD383.

Table 6
Metals Data Summary for Sediment Samples
MFLBC July, 1999
RÜTGERS Organics Corporation

Parameter	SD19 [ug/kg]	SD45 [ug/kg]	SD54 [ug/kg]	SD150 [ug/kg]	SD105 [ug/kg]	SD209 [ug/kg]	SD218 [ug/kg]	SD235 [ug/kg]	SD258 [ug/kg]	SD852 [ug/kg]
Aluminum	2220000	5300000	4320000	4370000	3130000	5820000	8520000	7450000	5540000	5340000
Antimony	203 B	217 B	323 B	269 B	271 B	325 B	21.5 U	401 B	45.8 B	35.9 B
Arsenic	5690	6340	9590	9490	7420	7850	12500	22700	4940	4700
Barium	58500	93600	82500	136000	70700	109000	233000	106000	68100	63700
Beryllium	526 B	894 B	874 B	734 B	598 B	946 B	1490	1600	918	887
Cadmium	159 B	208 B	225 B	237 B	263 B	489 B	532 B	383 B	435 B	387 B
Calcium	1370000	1390000	1190000	1430000	1550000	5020000	3500000	2390000	2230000	2040000
Chromium	5440	11600	10400	8430	7830	8880	12400	10700	9390	8920
Cobalt	6840 B	10700 B	10800 B	10000 B	7310 B	10700 B	13100 B	9420 B	9420 B	9300 B
Copper	23000	21900	24700	13200	8540	14100	16200	17500	12700	12100
Iron	20100000	34800000	38100000	42800000	30300000	28300000	26200000	41400000	16800000	16400000
Lead	13600	23600	17800	20100	18900	21900	22800	54500	20300	19100
Magnesium	723000 B	1700000	1380000	1330000	952000 B	1580000	2070000	2160000	1310000	1260000
Manganese	704000	779000	893000	591000	623000	811000	1160000	1390000	260000	259000
Mercury	55.3	54.9	59.3	62.4	51.2	100	89	143	59.3	94.5
Nickel	13200 B	19600 B	18800 B	23600 B	16100 B	21600 B	26000 B	18200 B	20100 B	20100 B
Potassium	255000 B	455000 B	405000 B	511000 B	289000 B	421000 B	452000 B	483000 B	338000 B	325000 B
Selenium	267 B	310 B	293 B	272 B	295 B	514 B	557 B	131 B	201 B	261 B
Silver	44.7 B	53.3 B	52.2 B	65.7 B	75.8 B	142 B	62.9 B	34.1 B	225 B	177 B
Sodium	54500	64000	58000	60100	46300	173000	147000	90300	165000	161000
Thallium	76.7 B	118 B	115 B	304 B	195 B	449 B	245 B	548 B	150 B	518 B
Vanadium	6450 B	14200	12200	9650 B	8540 B	11500	12800	14100	8890	8470
Zinc	46500	59400	57900	75000	71100	91300	83000	80500	79800	114000

Table 6
Metals Data Summary for Sediment Samples
MFLBC July, 1999
RÜTGERS Organics Corporation

Parameter	SD288 [ug/kg]	SD320 [ug/kg]	SD333 [ug/kg]	SD367 [ug/kg]	SD763 [ug/kg]	SD378 [ug/kg]	SD383 [ug/kg]	SD838 [ug/kg]	SD403 [ug/kg]
Aluminum	1040000	2540000	2210000	2140000	1910000	3760000	1960000	2620000	3080000
Antimony	21.5 U	21.5 U	31.4 B	114 B	21.5 U	55.5 B	29.8 B	68.4 B	55.4 B
Arsenic	1340 B	3830	4470	2980	2790	4570	4060	4250	4780
Barium	21100 B	34000	32300	43800	28300	42100	17800 B	42000	41300
Beryllium	103 B	367 B	294 B	215 B	226 B	401 B	362 B	475 B	981
Cadmium	63.5 B	80.3 B	113	159 B	92.8 B	97.9 B	114 B	201 B	133 B
Calcium	358000 B	1300000	2590000	1940000	1240000	2090000	1810000	2840000	11000000
Chromium	1880	4640	5160	14200	4630	7170	4270	7490	6480
Cobalt	1690 B	3730 B	3040 B	3380 B	3350 B	4890 B	3090 B	3900 B	3410 B
Copper	2240 B	5260	6720	7020	6140	11200	5610	9920	5560
Iron	3770000	15600000	16700000	9440000	9590000	15100000	16100000	16100000	25500000
Lead	3270	10400	10300	10000	7950	13800	8610	14200	12500
Magnesium	315000 B	1020000	1280000	860000	921000	1440000	1010000	1270000	2460000
Manganese	47400	307000	418000	259000	159000	269000	237000	304000	579000
Mercury	21.5 U	21.5 U	27.7	28.2	21.5 U	21.5 U	28.7	43	21.5 U
Nickel	3380 B	8830 B	7060 B	9380 B	7830 B	11600 B	8160 B	11100 B	6660 B
Potassium	70200 B	160000 B	184000 B	174000 B	127000 B	279000 B	134000 B	159000 B	252000 B
Selenium	47.3 U	47.3 U	64.5 B	47.3 U	47.3 U	47.3 U	47.3 U	47.3 U	127 B
Silver	24.7 U	24.7 U	88.2 B	139 B	24.7 U	24.7 U	24.7 U	24.7 U	24.7 U
Sodium	102000	102000	143000	234000	46700	141000	23200	70300	85100
Thallium	25.2 B	57.7 B	59.2 B	51 B	51.4 B	90.7 B	229 B	130 B	122 B
Vanadium	1870 B	5640 B	5660 B	4380 B	3760 B	7430	5060 B	6940	8120
Zinc	16200	37800	32600	39900	35400	42700	29900	39100	29200

SD54 is the field duplicate of SD45.
SD852 is the field duplicate of SD258.
SD763 is the field duplicate of SD367.
SD838 is the field duplicate of SD383.

Table 7
MPK Data Summary for Sediment Samples
MFLBC July, 1999
RÜTGERS Organics Corporation

Lab ID	Matrix	Sample ID	QC Type	Percent Solids	% Total Organic Carbon	% Fines	Mirex Result	Mirex Qualifier	Photomirex Result	Photomirex Qualifier	Kepone Result	Kepone Qualifier
L23745-1	Sediment	SD 403	Primary	81.20	0.40	14.0	ND	U	ND	U	ND	U
L23744-1	Sediment	SD 383	Primary	78.70	0.14	3.5	ND	U	ND	U	ND	U
L23744-2	Sediment	SD 838	Field Duplicate	79.53	0.18	4.3	ND	U	ND	U	ND	U
L23745-3	Sediment	SD 378	Primary	77.76	0.29	30.2	*21.2*	*N*	ND	U	ND	U
L23770-1	Sediment	SD 367	Primary	77.11	0.23	7.8	*380*	*D*	ND	U	ND	U
L23768-1	Sediment	SD 763	Field Duplicate	81.29	0.18	6.9	*504*	*D*	ND	U	ND	U
L23769-3	Sediment	SD 333	Primary	70.25	0.63	16.5	*361*	*D*	ND	U	ND	U
L23769-1	Sediment	SD 320	Primary	81.74	0.06	3.0	*4.19*	*J*	ND	U	ND	U
L23778-2	Sediment	SD 288	Primary	74.28	0.27	11.5	*28*	*N*	ND	U	ND	U
L23777-1	Sediment	SD 258	Primary	55.38	1.50	53.1	*165*		ND	U	ND	U
L23779-1	Sediment	SD 852	Field Duplicate	54.36	6.10	44.1	*187*		*2.5*	*J*	ND	U
L23789-1	Sediment	SD 235	Primary	60.98	1.06	46.4	*4.9*	*J*	ND	U	ND	U
L23789-4	Sediment	SD 218	Primary	47.13	2.60	50.5	*4.91*	*J*	ND	U	ND	U
L23815-2	Sediment	SD 209	Primary	62.54	1.38	36.5	*29.4*	*N*	ND	U	ND	U
L23816-2	Sediment	SD 150	Primary	55.38	2.25	11.8	*23.7*	*N*	ND	U	ND	U
L23815-5	Sediment	SD 105	Field Duplicate	74.92	2.38	10.3	*24.8*	*N*	ND	U	ND	U
L23885-6	Sediment	SD 45	Primary	63.15	0.83	22.0	*3.3*	*J*	ND	U	ND	U
L23884-1	Sediment	SD 54	Field Duplicate	59.80	0.79	16.7	ND	U	ND	U	ND	U
L23885-1	Sediment	SD 19	Primary	71.94	0.27	19.3	ND	U	ND	U	ND	U

All units are in ug/kg (ppb).
Qualifiers are defined as follows:

U = Analyte not detected Reporting limits - Mirex:12.3 - 16.7 ppb; Photomirex: 13.5 - 23.3 ppb; Kepone: 43.6 - 75.7 ppb.
J = Analyte detected at a concentration below the sample reporting limit.
D = Compound is present; result reported from a secondary dilution of the sample extract.
N = Tentatively Identified. Analyte presence strongly indicated but ion abundance ratio criteria are not met. This may be due to sample matrix effects.

Table 8
Surface Water Quality
MFLBC July, 1999
RÜTGERS Organics Corporation

Sample Numbers	River Miles	Temperature [°C]	Dissolved Oxygen [mg/l]	pH [s.u.]	Total Dissolved Solids [mg/l]	Conductivity [uS]	Stream Velocity [ft/s]	BOD-5 Day [mg/l]	Ammonia [mg/l]	Nitrite [mg/l]	Nitrate [mg/l]	Phosphorus [mg/l]	Total Suspended Solids [mg/l]
SW19	1.9	26.7	9.3	6.87	508	1038	0.62	3.38	0.2 U	0.1 U	0.338	0.326	1.5
SW45	4.4	26.6	9.9	7.91	534	1999	1.0	3.97	0.2 U	0.1 U	0.397	0.331	4.6
SW54	4.4	--	--	--	--	--	--	3.69	0.2 U	0.1 U	0.345	0.336	6.4
SW150	15.0	27.3	17.8	8.49	542	1072	0.30	3.95	0.2 U	0.1 U	1.04	0.797	3.1
SW209	20.9	30.1	13.7	7.18	736	1457	0.20	4.09	0.2 U	0.1 U	1.11	1.64	6.7
SW218	21.8	30.0	18.4	8.42	942	1847	0.30	3.37	0.2 U	0.1 U	1.16	2.81	4.8
SW235	23.5	24.3	8.8	7.82	1180	2360	0.30	6.99	0.2 U	0.1 U	1.96	4.92	6.3
SW258	25.8	23.8	8.2	7.85	1250	2440	0.56	4.89	0.2 U	0.1 U	2.8	6.19	9.4
SW288	28.8	25.2	8.0	7.95	1500	2960	0.30	5.52	0.2 U	0.1 U	5.56	12.1	6.4
SW320	32.0	24.6	7.8	8.14	713	1362	0.56	4.97	0.2 U	0.1 U	5.65	8.27	3.3
SW333	33.3	24.5	9.4	8.12	803	1578	0.67	5.61	0.2 U	0.1 U	9.31	8.03	3.3
SW367	36.7	26.8	8.6	7.95	1230	2420	0.48	5.05	0.2 U	0.1 U	10.3	11.9	3.0
SW378	37.7	27.0	10.7	7.69	1300	2550	0.83	6.01	0.2 U	0.1 U	11.7	13.2	3.1
SW383	38.3	29.2	15.9	8.35	387	776	0.30	7.2	0.2 U	0.1 U	0.148	0.111	17.9
SW838	38.3	--	--	--	--	--	--	7.47	0.2 U	0.1 U	0.109	0.105	3.4
SW403	40.3	28.2	13.6	8.33	282	552	N/A	5.9	0.2 U	0.1 U	0.72	0.188	9.7

SW54 is the field duplicate of SW45.
SW838 is the field duplicate of SW383.
N/A - not available
Temperature, Dissolved Oxygen, pH, Total Dissolved Solids, Conductivity, and Flow Velocity are field measurements by Davey Resource Group.

Ohio EPA/DSW Monitoring and Assessment Section
Macroinvertebrate Collection

Collection Date: 08/23/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 40.30

Taxa Code	Taxa	Quant/Qual
01320	*Hydra sp*	10
01801	*Turbellaria*	16 +
03600	*Oligochaeta*	922
04664	*Helobdella stagnalis*	2
04666	*Helobdella triserialis*	+
04686	*Placobdella papillifera*	+
04935	*Erpobdella punctata punctata*	3 +
04962	*Mooreobdella fervida*	1 +
05800	*Caecidotea sp*	6 +
06201	*Hyalella azteca*	30 +
06700	*Crangonyx sp*	+
08230	*Orconectes (Crokerinus) obscurus*	+
11200	*Callibaetis sp*	10 +
12501	*Heptageniidae*	+
17200	*Caenis sp*	2
21200	*Calopteryx sp*	+
22001	*Coenagrionidae*	9 +
23909	*Boyeria vinosa*	+
28500	*Libellula sp*	+
42700	*Belostoma sp*	+
45300	*Sigara sp*	+
52200	*Cheumatopsyche sp*	+
53800	*Hydroptila sp*	+
57400	*Neophylax sp*	+
60900	*Peltodytes sp*	3 +
63900	*Laccophilus sp*	+
67800	*Tropisternus sp*	+
68700	*Dubiraphia sp*	1
74100	*Simulium sp*	+
74501	*Ceratopogonidae*	8 +
77130	*Ablabesmyia rhamphe group*	1
77500	*Conchapelopia sp*	1 +
78200	*Larsia sp*	22 +
78350	*Meropelopia sp*	2 +
82730	*Chironomus (C.) decorus group*	1
83840	*Microtendipes pedellus group*	2
84210	*Paratendipes albimanus or P. duplicatus*	71 +
84450	*Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)*	+
84900	*Zavreliella marmorata*	1
84960	*Pseudochironomus sp*	1
86100	*Chrysops sp*	+
95100	*Physella sp*	1
96002	*Helisoma anceps anceps*	5
98200	*Pisidium sp*	+

No. Quantitative Taxa: 25 Total Taxa: 44
No. Qualitative Taxa: 32 ICI: **10**
Number of Organisms: 1131 Qual EPT: 5

Ohio EPA/DSW Monitoring and Assessment Section
Macroinvertebrate Collection

Collection Date: 08/23/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 38.20

Taxa Code	Taxa	Quant/Qual
03600	*Oligochaeta*	+
04686	*Placobdella papillifera*	+
08230	*Orconectes (Crokerinus) obscurus*	+
11120	*Baetis flavistriga*	+
11130	*Baetis intercalaris*	+
11200	*Callibaetis sp*	+
21200	*Calopteryx sp*	+
22300	*Argia sp*	+
24900	*Gomphus sp*	+
52200	*Cheumatopsyche sp*	+
52440	*Ceratopsyche slossonae*	+
52530	*Hydropsyche depravata group*	+
60900	*Peltodytes sp*	+
65700	*Anacaena sp*	+
67800	*Tropisternus sp*	+
68708	*Dubiraphia vittata group*	+
69400	*Stenelmis sp*	+
71900	*Tipula sp*	+
77500	*Conchapelopia sp*	+
78401	*Natarsia species A (sensu Roback, 1978)*	+
80410	*Cricotopus (C.) sp*	+
80420	*Cricotopus (C.) bicinctus*	+
80430	*Cricotopus (C.) tremulus group*	+
81825	*Rheocricotopus (Psilocricotopus) robacki*	+
82730	*Chironomus (C.) decorus group*	+
82820	*Cryptochironomus sp*	+
84450	*Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)*	+
84460	*Polypedilum (P.) fallax group*	+
84470	*Polypedilum (P.) illinoense*	+
85800	*Tanytarsus sp*	+
87400	*Stratiomys sp*	+
95100	*Physella sp*	+
98600	*Sphaerium sp*	+

No. Quantitative Taxa: 0	Total Taxa: 33
No. Qualitative Taxa: 33	ICI:
Number of Organisms: 0	Qual EPT: 6

Ohio EPA/DSW Monitoring and Assessment Section
Macroinvertebrate Collection

Collection Date: 08/23/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 37.70

Taxa Code	Taxa	Quant/Qual
01801	*Turbellaria*	9 +
03360	*Plumatella sp*	+
03600	*Oligochaeta*	304
04962	*Mooreobdella fervida*	+
05800	*Caecidotea sp*	+
06700	*Crangonyx sp*	33 +
11120	*Baetis flavistriga*	1
11200	*Callibaetis sp*	+
16700	*Tricorythodes sp*	4
21200	*Calopteryx sp*	1 +
22001	*Coenagrionidae*	+
22300	*Argia sp*	7
23909	*Boyeria vinosa*	1 +
47600	*Sialis sp*	+
52200	*Cheumatopsyche sp*	114 +
52430	*Ceratopsyche morosa group*	3
52440	*Ceratopsyche slossonae*	3 +
52530	*Hydropsyche depravata group*	159 +
58505	*Helicopsyche borealis*	+
67800	*Tropisternus sp*	+
68707	*Dubiraphia quadrinotata*	+
69400	*Stenelmis sp*	3 +
74100	*Simulium sp*	6
77500	*Conchapelopia sp*	99 +
77750	*Hayesomyia senata or Thienemannimyia norena*	+
77800	*Helopelopia sp*	20 +
78401	*Natarsia species A (sensu Roback, 1978)*	+
78450	*Nilotanypus fimbriatus*	20
80350	*Corynoneura sp*	16
80410	*Cricotopus (C.) sp*	119
80420	*Cricotopus (C.) bicinctus*	119 +
80430	*Cricotopus (C.) tremulus group*	139 +
81231	*Nanocladius (N.) crassicornus or N. (N.) "rectinervis"*	20
81240	*Nanocladius (N.) distinctus*	40
81825	*Rheocricotopus (Psilocricotopus) robacki*	617 +
82141	*Thienemanniella xena*	580 +
82730	*Chironomus (C.) decorus group*	20
82820	*Cryptochironomus sp*	+
84450	*Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)*	40
84460	*Polypedilum (P.) fallax group*	119 +
84470	*Polypedilum (P.) illinoense*	80 +
85500	*Paratanytarsus sp*	40
85625	*Rheotanytarsus exiguus group*	40
85814	*Tanytarsus glabrescens group*	40
87540	*Hemerodromia sp*	27 +
95100	*Physella sp*	288 +
96900	*Ferrissia sp*	347 +

No. Quantitative Taxa: 35 Total Taxa: 47
No. Qualitative Taxa: 31 ICI: **28**
Number of Organisms: 3478 Qual EPT: 5

Ohio EPA/DSW Monitoring and Assessment Section
Macroinvertebrate Collection

Collection Date: 08/23/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 36.70

Taxa Code	Taxa	Quant/Qual
01801	*Turbellaria*	31 +
03360	*Plumatella sp*	1
03600	*Oligochaeta*	93 +
04935	*Erpobdella punctata punctata*	+
04960	*Mooreobdella sp*	+
06700	*Crangonyx sp*	4 +
11130	*Baetis intercalaris*	4
21200	*Calopteryx sp*	11 +
22001	*Coenagrionidae*	+
22300	*Argia sp*	27
23909	*Boyeria vinosa*	4 +
24900	*Gomphus sp*	+
28955	*Libellula lydia*	+
47600	*Sialis sp*	1
52200	*Cheumatopsyche sp*	850 +
52430	*Ceratopsyche morosa group*	17 +
52440	*Ceratopsyche slossonae*	16
52530	*Hydropsyche depravata group*	200 +
60900	*Peltodytes sp*	+
65700	*Anacaena sp*	+
67800	*Tropisternus sp*	+
68130	*Helichus sp*	+
68601	*Ancyronyx variegata*	1
68708	*Dubiraphia vittata group*	10 +
68901	*Macronychus glabratus*	15 +
69225	*Optioservus fastiditus*	+
69400	*Stenelmis sp*	42 +
74501	*Ceratopogonidae*	+
77500	*Conchapelopia sp*	45
77750	*Hayesomyia senata or Thienemannimyia norena*	7
77800	*Helopelopia sp*	53
78401	*Natarsia species A (sensu Roback, 1978)*	+
78450	*Nilotanypus fimbriatus*	27
80370	*Corynoneura lobata*	16
81231	*Nanocladius (N.) crassicornus or N. (N.) "rectinervis"*	13
81270	*Nanocladius (N.) spiniplenus*	7
81825	*Rheocricotopus (Psilocricotopus) robacki*	376 +
82141	*Thienemanniella xena*	4
83040	*Dicrotendipes neomodestus*	+
83300	*Glyptotendipes (G.) sp*	7
84415	*Polypedilum (P.) sp*	+
84460	*Polypedilum (P.) fallax group*	121
84540	*Polypedilum (Tripodura) scalaenum group*	7
84700	*Stenochironomus sp*	+
84750	*Stictochironomus sp*	+
85500	*Paratanytarsus sp*	34
85625	*Rheotanytarsus exiguus group*	13
85800	*Tanytarsus sp*	20
87540	*Hemerodromia sp*	2
95100	*Physella sp*	17 +
96900	*Ferrissia sp*	100

No. Quantitative Taxa: 35 Total Taxa: 51
No. Qualitative Taxa: 29 ICI: **32**
Number of Organisms: 2196 Qual EPT: 3

Ohio EPA/DSW Monitoring and Assessment Section
Macroinvertebrate Collection

Collection Date: 08/24/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 33.30

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	*Turbellaria*	56 +			
03360	*Plumatella sp*	+			
03600	*Oligochaeta*	3 +			
08230	*Orconectes (Crokerinus) obscurus*	+			
11130	*Baetis intercalaris*	245 +			
21200	*Calopteryx sp*	+			
30000	*Plecoptera*	2			
52200	*Cheumatopsyche sp*	402 +			
52430	*Ceratopsyche morosa group*	251 +			
52450	*Ceratopsyche sparna*	13 +			
52530	*Hydropsyche depravata group*	492 +			
63300	*Hydroporus sp*	+			
67800	*Tropisternus sp*	+			
68601	*Ancyronyx variegata*	8 +			
68708	*Dubiraphia vittata group*	+			
68901	*Macronychus glabratus*	2			
69225	*Optioservus fastiditus*	+			
69400	*Stenelmis sp*	16 +			
70600	*Antocha sp*	9 +			
77500	*Conchapelopia sp*	4			
78450	*Nilotanypus fimbriatus*	10			
80204	*Brillia flavifrons group*	7			
80370	*Corynoneura lobata*	79			
80420	*Cricotopus (C.) bicinctus*	4			
81650	*Parametriocnemus sp*	15			
81690	*Paratrichocladius sp*	4			
81825	*Rheocricotopus (Psilocricotopus) robacki*	59			
82141	*Thienemanniella xena*	13			
84450	*Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)*	140			
84460	*Polypedilum (P.) fallax group*	11			
85500	*Paratanytarsus sp*	4			
85625	*Rheotanytarsus exiguus group*	33			
85800	*Tanytarsus sp*	4			
85814	*Tanytarsus glabrescens group*	26			
86100	*Chrysops sp*	+			
96900	*Ferrissia sp*	4			

No. Quantitative Taxa: 28 Total Taxa: 36
No. Qualitative Taxa: 18 ICI: **40**
Number of Organisms: 1916 Qual EPT: 5

Ohio EPA/DSW Monitoring and Assessment Section
Macroinvertebrate Collection

Collection Date: 08/24/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 32.00

Taxa Code	Taxa	Quant/Qual
01801	*Turbellaria*	11
03360	*Plumatella sp*	+
03600	*Oligochaeta*	70 +
05800	*Caecidotea sp*	1
06700	*Crangonyx sp*	2 +
08230	*Orconectes (Crokerinus) obscurus*	+
08601	*Hydracarina*	1
11130	*Baetis intercalaris*	32 +
16700	*Tricorythodes sp*	5
17200	*Caenis sp*	39
21200	*Calopteryx sp*	26 +
22001	*Coenagrionidae*	+
22300	*Argia sp*	1
23804	*Basiaeschna janata*	+
44501	*Corixidae*	+
52200	*Cheumatopsyche sp*	196 +
52430	*Ceratopsyche morosa group*	5 +
52450	*Ceratopsyche sparna*	+
52530	*Hydropsyche depravata group*	18 +
58505	*Helicopsyche borealis*	+
67800	*Tropisternus sp*	+
68025	*Ectopria sp*	+
68601	*Ancyronyx variegata*	31 +
68700	*Dubiraphia sp*	14
68901	*Macronychus glabratus*	1 +
69400	*Stenelmis sp*	5 +
77500	*Conchapelopia sp*	16
77750	*Hayesomyia senata or Thienemannimyia norena*	+
77800	*Helopelopia sp*	64
78450	*Nilotanypus fimbriatus*	132
80370	*Corynoneura lobata*	17
80410	*Cricotopus (C.) sp*	16
81231	*Nanocladius (N.) crassicornus or N. (N.) "rectinervis"*	64
81825	*Rheocricotopus (Psilocricotopus) robacki*	96
82820	*Cryptochironomus sp*	+
83040	*Dicrotendipes neomodestus*	16
84210	*Paratendipes albimanus or P. duplicatus*	+
84450	*Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)*	32
84460	*Polypedilum (P.) fallax group*	80
84470	*Polypedilum (P.) illinoense*	+
84520	*Polypedilum (Tripodura) halterale group*	+
84540	*Polypedilum (Tripodura) scalaenum group*	+
84700	*Stenochironomus sp*	+
84750	*Stictochironomus sp*	+
85230	*Cladotanytarsus mancus group*	+
85500	*Paratanytarsus sp*	80
85625	*Rheotanytarsus exiguus group*	80
85821	*Tanytarsus glabrescens group sp 7*	642
85840	*Tanytarsus guerlus group*	80
87400	*Stratiomys sp*	+
87540	*Hemerodromia sp*	2
96900	*Ferrissia sp*	18

No. Quantitative Taxa: 33 Total Taxa: 52
No. Qualitative Taxa: 29 ICI: **40**
Number of Organisms: 1893 Qual EPT: 6

Ohio EPA/DSW Monitoring and Assessment Section
Macroinvertebrate Collection

Collection Date: 08/24/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 28.80

Taxa Code	Taxa	Quant/Qual
01801	*Turbellaria*	4 +
03360	*Plumatella sp*	1
03600	*Oligochaeta*	5
06201	*Hyalella azteca*	+
06700	*Crangonyx sp*	1 +
08230	*Orconectes (Crokerinus) obscurus*	+
11130	*Baetis intercalaris*	22 +
17200	*Caenis sp*	18
21200	*Calopteryx sp*	+
22001	*Coenagrionidae*	2 +
22300	*Argia sp*	32 +
52200	*Cheumatopsyche sp*	70 +
52430	*Ceratopsyche morosa group*	1 +
52530	*Hydropsyche depravata group*	5 +
63300	*Hydroporus sp*	+
68601	*Ancyronyx variegata*	135 +
68708	*Dubiraphia vittata group*	1 +
68901	*Macronychus glabratus*	52 +
69400	*Stenelmis sp*	5 +
71900	*Tipula sp*	+
77355	*Clinotanypus pinguis*	+
77500	*Conchapelopia sp*	34
77750	*Hayesomyia senata or Thienemannimyia norena*	80
77800	*Helopelopia sp*	11
78401	*Natarsia species A (sensu Roback, 1978)*	+
78450	*Nilotanypus fimbriatus*	4
81231	*Nanocladius (N.) crassicornus or N. (N.) "rectinervis"*	10
81240	*Nanocladius (N.) distinctus*	29
81650	*Parametriocnemus sp*	10
81825	*Rheocricotopus (Psilocricotopus) robacki*	10
82141	*Thienemanniella xena*	4 +
84020	*Parachironomus carinatus*	19
84450	*Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)*	38
84460	*Polypedilum (P.) fallax group*	10
84520	*Polypedilum (Tripodura) halterale group*	+
85500	*Paratanytarsus sp*	67
85625	*Rheotanytarsus exiguus group*	19
85800	*Tanytarsus sp*	10
85821	*Tanytarsus glabrescens group sp 7*	516
85840	*Tanytarsus guerlus group*	38
86100	*Chrysops sp*	+
89501	*Ephydridae*	1
96900	*Ferrissia sp*	17 +

No. Quantitative Taxa: 34 Total Taxa: 43
No. Qualitative Taxa: 23 ICI: **40**
Number of Organisms: 1281 Qual EPT: 4

Ohio EPA/DSW Monitoring and Assessment Section
Macroinvertebrate Collection

Collection Date: 08/24/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 25.80

Taxa Code	Taxa	Quant/Qual
03600	*Oligochaeta*	63 +
04686	*Placobdella papillifera*	+
06201	*Hyalella azteca*	+
11130	*Baetis intercalaris*	8 +
13400	*Stenacron sp*	1 +
17200	*Caenis sp*	18
21200	*Calopteryx sp*	18
22001	*Coenagrionidae*	+
25510	*Stylogomphus albistylus*	+
45300	*Sigara sp*	+
52200	*Cheumatopsyche sp*	267 +
52530	*Hydropsyche depravata group*	1
57900	*Pycnopsyche sp*	+
60900	*Peltodytes sp*	+
63300	*Hydroporus sp*	+
68601	*Ancyronyx variegata*	9
68901	*Macronychus glabratus*	17
69400	*Stenelmis sp*	3 +
77500	*Conchapelopia sp*	46
77750	*Hayesomyia senata or Thienemannimyia norena*	139 +
77800	*Helopelopia sp*	70 +
78450	*Nilotanypus fimbriatus*	38
80370	*Corynoneura lobata*	8
80410	*Cricotopus (C.) sp*	90
81631	*Parakiefferiella n.sp 1*	45
81632	*Parakiefferiella n.sp 2*	90
81825	*Rheocricotopus (Psilocricotopus) robacki*	105
82141	*Thienemanniella xena*	4
82730	*Chironomus (C.) decorus group*	+
82820	*Cryptochironomus sp*	+
83040	*Dicrotendipes neomodestus*	121
84210	*Paratendipes albimanus or P. duplicatus*	+
84450	*Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)*	60
84460	*Polypedilum (P.) fallax group*	136
84540	*Polypedilum (Tripodura) scalaenum group*	30
85500	*Paratanytarsus sp*	30
85625	*Rheotanytarsus exiguus group*	30
85800	*Tanytarsus sp*	30
85821	*Tanytarsus glabrescens group sp 7*	241
85840	*Tanytarsus guerlus group*	60
86401	*Atherix lantha*	+
95100	*Physella sp*	+
96900	*Ferrissia sp*	101 +
98600	*Sphaerium sp*	+

No. Quantitative Taxa: 30 Total Taxa: 44
No. Qualitative Taxa: 22 ICI: **30**
Number of Organisms: 1879 Qual EPT: 4

Ohio EPA/DSW Monitoring and Assessment Section
Macroinvertebrate Collection

Collection Date: 08/25/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 23.50

Taxa Code	Taxa	Quant/Qual
01801	*Turbellaria*	2
03360	*Plumatella sp*	1
03600	*Oligochaeta*	13
06201	*Hyalella azteca*	1
06700	*Crangonyx sp*	+
08230	*Orconectes (Crokerinus) obscurus*	+
08601	*Hydracarina*	8
11130	*Baetis intercalaris*	99 +
21200	*Calopteryx sp*	1 +
45100	*Palmacorixa sp*	+
45900	*Notonecta sp*	+
50804	*Lype diversa*	1
52200	*Cheumatopsyche sp*	94 +
52430	*Ceratopsyche morosa group*	85 +
52530	*Hydropsyche depravata group*	15 +
53800	*Hydroptila sp*	29
60800	*Haliplus sp*	+
68901	*Macronychus glabratus*	2
69400	*Stenelmis sp*	+
70600	*Antocha sp*	2
77500	*Conchapelopia sp*	19
77750	*Hayesomyia senata or Thienemannimyia norena*	56
78450	*Nilotanypus fimbriatus*	48
80370	*Corynoneura lobata*	8
80410	*Cricotopus (C.) sp*	150
80430	*Cricotopus (C.) tremulus group*	37
81231	*Nanocladius (N.) crassicornus or N. (N.) "rectinervis"*	19
81270	*Nanocladius (N.) spiniplenus*	37
81632	*Parakiefferiella n.sp 2*	300 +
81690	*Paratrichocladius sp*	56
81825	*Rheocricotopus (Psilocricotopus) robacki*	224 +
83040	*Dicrotendipes neomodestus*	19
84450	*Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)*	56
84460	*Polypedilum (P.) fallax group*	37
85500	*Paratanytarsus sp*	75
85625	*Rheotanytarsus exiguus group*	93
85821	*Tanytarsus glabrescens group sp 7*	561
86401	*Atherix lantha*	1 +
87540	*Hemerodromia sp*	5
96900	*Ferrissia sp*	12

Taxa Code	Taxa	Quant/Qual

No. Quantitative Taxa: 34 Total Taxa: 40
No. Qualitative Taxa: 14 ICI: **38**
Number of Organisms: 2166 Qual EPT: 4

Ohio EPA/DSW Monitoring and Assessment Section
Macroinvertebrate Collection

Collection Date: 08/25/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 21.80

Taxa Code	Taxa	Quant/Qual
03360	*Plumatella sp*	1
03600	*Oligochaeta*	4 +
05800	*Caecidotea sp*	5 +
08230	*Orconectes (Crokerinus) obscurus*	+
08601	*Hydracarina*	4
11130	*Baetis intercalaris*	177 +
16700	*Tricorythodes sp*	1
17200	*Caenis sp*	+
21200	*Calopteryx sp*	9 +
23804	*Basiaeschna janata*	+
45100	*Palmacorixa sp*	+
45400	*Trichocorixa sp*	+
50804	*Lype diversa*	20
52200	*Cheumatopsyche sp*	855 +
52430	*Ceratopsyche morosa group*	733 +
52440	*Ceratopsyche slossonae*	+
52530	*Hydropsyche depravata group*	27 +
53800	*Hydroptila sp*	13
63300	*Hydroporus sp*	+
63900	*Laccophilus sp*	+
67800	*Tropisternus sp*	+
68130	*Helichus sp*	1
68601	*Ancyronyx variegata*	4 +
68901	*Macronychus glabratus*	27 +
69400	*Stenelmis sp*	24 +
70600	*Antocha sp*	9
77500	*Conchapelopia sp*	42
77750	*Hayesomyia senata or Thienemannimyia norena*	66 +
78450	*Nilotanypus fimbriatus*	18
80370	*Corynoneura lobata*	4
80410	*Cricotopus (C.) sp*	17
80420	*Cricotopus (C.) bicinctus*	17
81465	*Orthocladius (O.) carlatus*	8
81632	*Parakiefferiella n.sp 2*	17 +
81825	*Rheocricotopus (Psilocricotopus) robacki*	58
82101	*Thienemanniella n.sp 1*	5
82141	*Thienemanniella xena*	13
82200	*Tvetenia bavarica group*	8
83820	*Microtendipes "caelum" (sensu Simpson & Bode, 1980)*	+
84450	*Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)*	58
84460	*Polypedilum (P.) fallax group*	8 +
85500	*Paratanytarsus sp*	33
85625	*Rheotanytarsus exiguus group*	150
85802	*Tanytarsus curticornis group*	8
85821	*Tanytarsus glabrescens group sp 7*	248
85840	*Tanytarsus guerlus group*	8 +
86401	*Atherix lantha*	1 +
87540	*Hemerodromia sp*	5
95100	*Physella sp*	+
96900	*Ferrissia sp*	33
99100	*Pyganodon grandis*	+

No. Quantitative Taxa: 39 Total Taxa: 51
No. Qualitative Taxa: 27 ICI: **44**
Number of Organisms: 2739 Qual EPT: 6

Ohio EPA/DSW Monitoring and Assessment Section
Macroinvertebrate Collection

Collection Date: 08/25/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 20.90

Taxa Code	Taxa	Quant/Qual
01801	*Turbellaria*	17 +
03360	*Plumatella sp*	1
03600	*Oligochaeta*	90
04653	*Glossiphonia complanata*	1
04666	*Helobdella triserialis*	1
05800	*Caecidotea sp*	+
06201	*Hyalella azteca*	+
08230	*Orconectes (Crokerinus) obscurus*	1 +
11130	*Baetis intercalaris*	1 +
13400	*Stenacron sp*	1
16700	*Tricorythodes sp*	1
17200	*Caenis sp*	26
21200	*Calopteryx sp*	6 +
22001	*Coenagrionidae*	4 +
22300	*Argia sp*	4
45900	*Notonecta sp*	+
52200	*Cheumatopsyche sp*	12 +
52430	*Ceratopsyche morosa group*	+
52530	*Hydropsyche depravata group*	+
53800	*Hydroptila sp*	3
54200	*Orthotrichia sp*	2
60300	*Dineutus sp*	+
65800	*Berosus sp*	2
67800	*Tropisternus sp*	+
68130	*Helichus sp*	+
68601	*Ancyronyx variegata*	12 +
68707	*Dubiraphia quadrinotata*	+
68708	*Dubiraphia vittata group*	60 +
68901	*Macronychus glabratus*	11 +
69400	*Stenelmis sp*	+
71100	*Hexatoma sp*	+
71900	*Tipula sp*	+
74100	*Simulium sp*	2
74501	*Ceratopogonidae*	4
77120	*Ablabesmyia mallochi*	6
77500	*Conchapelopia sp*	25 +
77750	*Hayesomyia senata or Thienemannimyia norena*	123 +
77800	*Helopelopia sp*	117
78140	*Labrundinia pilosella*	4
80510	*Cricotopus (Isocladius) sylvestris group*	+
83002	*Dicrotendipes modestus*	6
83040	*Dicrotendipes neomodestus*	31
83051	*Dicrotendipes simpsoni*	6
83300	*Glyptotendipes (G.) sp*	6
84210	*Paratendipes albimanus or P. duplicatus*	18
84300	*Phaenopsectra obediens group*	12
84450	*Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)*	12
84460	*Polypedilum (P.) fallax group*	18
84470	*Polypedilum (P.) illinoense*	6 +
84520	*Polypedilum (Tripodura) halterale group*	6
84540	*Polypedilum (Tripodura) scalaenum group*	68
85500	*Paratanytarsus sp*	62
85625	*Rheotanytarsus exiguus group*	6
85800	*Tanytarsus sp*	6
85802	*Tanytarsus curticornis group*	6
85821	*Tanytarsus glabrescens group sp 7*	6
85840	*Tanytarsus guerlus group*	18
94400	*Fossaria sp*	+
95100	*Physella sp*	14 +
96900	*Ferrissia sp*	9 +

No. Quantitative Taxa: 46 Total Taxa: 60
No. Qualitative Taxa: 28 ICI: **26**
Number of Organisms: 853 Qual EPT: 4

Ohio EPA/DSW Monitoring and Assessment Section
Macroinvertebrate Collection

Collection Date: 08/25/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 15.00

Taxa Code	Taxa	Quant	Qual
01320	*Hydra sp*	12	
03360	*Plumatella sp*		+
03600	*Oligochaeta*		+
04685	*Placobdella ornata*	1	
05800	*Caecidotea sp*		+
06201	*Hyalella azteca*		+
06700	*Crangonyx sp*		+
08230	*Orconectes (Crokerinus) obscurus*		+
08601	*Hydracarina*	8	
11130	*Baetis intercalaris*	634	+
11670	*Procloeon irrubrum*		+
12200	*Isonychia sp*	128	+
13400	*Stenacron sp*		+
13561	*Stenonema pulchellum*	8	
17200	*Caenis sp*	10	+
21200	*Calopteryx sp*		+
23909	*Boyeria vinosa*		+
42700	*Belostoma sp*		+
45300	*Sigara sp*		+
47600	*Sialis sp*		+
52200	*Cheumatopsyche sp*	197	+
52430	*Ceratopsyche morosa group*	537	
52530	*Hydropsyche depravata group*	20	
52540	*Hydropsyche dicantha*	43	
63300	*Hydroporus sp*		+
67700	*Paracymus sp*		+
68601	*Ancyronyx variegata*		+
68708	*Dubiraphia vittata group*		+
68901	*Macronychus glabratus*	32	+
69400	*Stenelmis sp*	1	+
74100	*Simulium sp*	15	
77120	*Ablabesmyia mallochi*		+
77500	*Conchapelopia sp*	18	+
77750	*Hayesomyia senata or Thienemannimyia norena*		+
77800	*Helopelopia sp*		+
78401	*Natarsia species A (sensu Roback, 1978)*		+
78450	*Nilotanypus fimbriatus*	21	
80370	*Corynoneura lobata*	8	
80410	*Cricotopus (C.) sp*		+
81825	*Rheocricotopus (Psilocricotopus) robacki*	46	
82101	*Thienemanniella n.sp 1*	8	
84450	*Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)*	28	
84470	*Polypedilum (P.) illinoense*		+
84540	*Polypedilum (Tripodura) scalaenum group*		+
85625	*Rheotanytarsus exiguus group*	962	+
85800	*Tanytarsus sp*	9	
85821	*Tanytarsus glabrescens group sp 7*	18	+
85840	*Tanytarsus guerlus group*	9	
86401	*Atherix lantha*	1	
95100	*Physella sp*		+
96900	*Ferrissia sp*	43	+
98600	*Sphaerium sp*		+

No. Quantitative Taxa: 26 Total Taxa: 52
No. Qualitative Taxa: 36 ICI: **44**
Number of Organisms: 2817 Qual EPT: 6

Ohio EPA/DSW Monitoring and Assessment Section
Macroinvertebrate Collection

Collection Date: 09/01/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 10.70

Taxa Code	Taxa	Quant/Qual
00653	*Eunapius fragilis*	+
01801	*Turbellaria*	35 +
03360	*Plumatella sp*	1
03600	*Oligochaeta*	48
05800	*Caecidotea sp*	+
08601	*Hydracarina*	25
11130	*Baetis intercalaris*	1 +
12200	*Isonychia sp*	13 +
13400	*Stenacron sp*	4
13561	*Stenonema pulchellum*	7
13590	*Stenonema vicarium*	11
16700	*Tricorythodes sp*	3
17200	*Caenis sp*	129 +
18600	*Ephemera sp*	2 +
21200	*Calopteryx sp*	1 +
21300	*Hetaerina sp*	+
22001	*Coenagrionidae*	+
22300	*Argia sp*	1
24900	*Gomphus sp*	+
47600	*Sialis sp*	+
48410	*Corydalus cornutus*	+
52200	*Cheumatopsyche sp*	1081 +
52430	*Ceratopsyche morosa group*	138 +
52530	*Hydropsyche depravata group*	+
52540	*Hydropsyche dicantha*	48 +
53800	*Hydroptila sp*	+
60300	*Dineutus sp*	+
68601	*Ancyronyx variegata*	18
68708	*Dubiraphia vittata group*	3 +
68901	*Macronychus glabratus*	34 +
70600	*Antocha sp*	9 +
77750	*Hayesomyia senata or Thienemannimyia norena*	568 +
77800	*Helopelopia sp*	+
78650	*Procladius sp*	+
80410	*Cricotopus (C.) sp*	32
81240	*Nanocladius (N.) distinctus*	32
81825	*Rheocricotopus (Psilocricotopus) robacki*	158
82730	*Chironomus (C.) decorus group*	+
82820	*Cryptochironomus sp*	+
83040	*Dicrotendipes neomodestus*	158 +
84060	*Parachironomus pectinatellae*	32
84450	*Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)*	915 +
84470	*Polypedilum (P.) illinoense*	+
84540	*Polypedilum (Tripodura) scalaenum group*	32
84750	*Stictochironomus sp*	+
85500	*Paratanytarsus sp*	95
85625	*Rheotanytarsus exiguus group*	410
85752	*Sublettea coffmani*	32
85814	*Tanytarsus glabrescens group*	694 +
85840	*Tanytarsus guerlus group*	158
86401	*Atherix lantha*	+
95100	*Physella sp*	+
96900	*Ferrissia sp*	288 +
98001	*Sphaeriidae*	9

No. Quantitative Taxa: 36 Total Taxa: 54
No. Qualitative Taxa: 35 ICI: **36**
Number of Organisms: 5225 Qual EPT: 9

Ohio EPA/DSW Monitoring and Assessment Section
Macroinvertebrate Collection

Collection Date: 09/01/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 10.00

Taxa Code	Taxa	Quant/Qual
01801	*Turbellaria*	50 +
03360	*Plumatella sp*	1
03600	*Oligochaeta*	32 +
05800	*Caecidotea sp*	1 +
06700	*Crangonyx sp*	+
08601	*Hydracarina*	12 +
11130	*Baetis intercalaris*	23 +
12200	*Isonychia sp*	23 +
13400	*Stenacron sp*	4 +
13561	*Stenonema pulchellum*	6 +
13590	*Stenonema vicarium*	2
16700	*Tricorythodes sp*	30
17200	*Caenis sp*	30 +
18600	*Ephemera sp*	+
21200	*Calopteryx sp*	1 +
25300	*Ophiogomphus sp*	+
47600	*Sialis sp*	+
48620	*Nigronia serricornis*	+
52200	*Cheumatopsyche sp*	795 +
52430	*Ceratopsyche morosa group*	149 +
52530	*Hydropsyche depravata group*	71 +
52540	*Hydropsyche dicantha*	42 +
59500	*Oecetis sp*	8
67700	*Paracymus sp*	+
67800	*Tropisternus sp*	+
68601	*Ancyronyx variegata*	1
68708	*Dubiraphia vittata group*	+
68901	*Macronychus glabratus*	16
69400	*Stenelmis sp*	9 +
70600	*Antocha sp*	3 +
77120	*Ablabesmyia mallochi*	+
77500	*Conchapelopia sp*	35
77740	*Hayesomyia senata*	140 +
77800	*Helopelopia sp*	35
81530	*Orthocladius (Symposiocladius) lignicola*	16
81690	*Paratrichocladius sp*	+
82141	*Thienemanniella xena*	+
82220	*Tvetenia discoloripes group*	+
82820	*Cryptochironomus sp*	16 +
83040	*Dicrotendipes neomodestus*	48 +
84450	*Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)*	450 +
84750	*Stictochironomus sp*	+
85500	*Paratanytarsus sp*	48
85625	*Rheotanytarsus exiguus group*	306
85752	*Sublettea coffmani*	48
85821	*Tanytarsus glabrescens group sp 7*	225
85840	*Tanytarsus guerlus group*	80
86401	*Atherix lantha*	1 +
96900	*Ferrissia sp*	218 +

No. Quantitative Taxa: 36 Total Taxa: 49
No. Qualitative Taxa: 35 ICI: **42**
Number of Organisms: 2975 Qual EPT: 10

Ohio EPA/DSW Monitoring and Assessment Section
Macroinvertebrate Collection

Collection Date: 08/24/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 9.00

Taxa Code	Taxa	Quant/Qual
01801	*Turbellaria*	1 +
03360	*Plumatella sp*	1
05800	*Caecidotea sp*	+
06700	*Crangonyx sp*	+
08230	*Orconectes (Crokerinus) obscurus*	+
08601	*Hydracarina*	31
11130	*Baetis intercalaris*	41 +
12200	*Isonychia sp*	14 +
13561	*Stenonema pulchellum*	18
16700	*Tricorythodes sp*	9
17200	*Caenis sp*	12 +
18600	*Ephemera sp*	+
21200	*Calopteryx sp*	+
22001	*Coenagrionidae*	+
23909	*Boyeria vinosa*	+
45100	*Palmacorixa sp*	+
47600	*Sialis sp*	+
52200	*Cheumatopsyche sp*	274 +
52430	*Ceratopsyche morosa group*	253 +
52530	*Hydropsyche depravata group*	11 +
52540	*Hydropsyche dicantha*	34 +
59500	*Oecetis sp*	1
68601	*Ancyronyx variegata*	2
68708	*Dubiraphia vittata group*	1 +
68901	*Macronychus glabratus*	12 +
69400	*Stenelmis sp*	2 +
70600	*Antocha sp*	1 +
77120	*Ablabesmyia mallochi*	+
77355	*Clinotanypus pinguis*	+
77750	*Hayesomyia senata or Thienemannimyia norena*	52 +
78401	*Natarsia species A (sensu Roback, 1978)*	+
78450	*Nilotanypus fimbriatus*	25
81270	*Nanocladius (N.) spiniplenus*	17 +
81825	*Rheocricotopus (Psilocricotopus) robacki*	156 +
82730	*Chironomus (C.) decorus group*	+
82820	*Cryptochironomus sp*	+
83040	*Dicrotendipes neomodestus*	139
84450	*Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)*	295 +
84470	*Polypedilum (P.) illinoense*	+
84540	*Polypedilum (Tripodura) scalaenum group*	+
84750	*Stictochironomus sp*	+
85500	*Paratanytarsus sp*	17
85625	*Rheotanytarsus exiguus group*	660
85752	*Sublettea coffmani*	69
85821	*Tanytarsus glabrescens group sp 7*	208
86100	*Chrysops sp*	+
86401	*Atherix lantha*	+
87540	*Hemerodromia sp*	+
96900	*Ferrissia sp*	39 +

No. Quantitative Taxa: 29 Total Taxa: 49
No. Qualitative Taxa: 37 ICI: **40**
Number of Organisms: 2395 Qual EPT: 8

Ohio EPA/DSW Monitoring and Assessment Section
Macroinvertebrate Collection

Collection Date: 08/24/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 8.40

Taxa Code	Taxa	Quant/Qual
01801	*Turbellaria*	18 +
03451	*Urnatella gracilis*	+
03600	*Oligochaeta*	4 +
05800	*Caecidotea sp*	+
06700	*Crangonyx sp*	+
08230	*Orconectes (Crokerinus) obscurus*	+
08601	*Hydracarina*	20
11130	*Baetis intercalaris*	22 +
11250	*Centroptilum sp (w/o hindwing pads)*	+
12200	*Isonychia sp*	9 +
13400	*Stenacron sp*	12 +
13561	*Stenonema pulchellum*	62 +
13590	*Stenonema vicarium*	10
16700	*Tricorythodes sp*	9
17200	*Caenis sp*	24 +
18100	*Anthopotamus sp*	+
18600	*Ephemera sp*	+
22001	*Coenagrionidae*	+
22300	*Argia sp*	2 +
23909	*Boyeria vinosa*	+
24900	*Gomphus sp*	+
25300	*Ophiogomphus sp*	+
25510	*Stylogomphus albistylus*	+
34110	*Acroneuria abnormis*	1
45300	*Sigara sp*	+
47600	*Sialis sp*	+
51300	*Neureclipsis sp*	2
52200	*Cheumatopsyche sp*	460 +
52430	*Ceratopsyche morosa group*	208 +
52530	*Hydropsyche depravata group*	3 +
52540	*Hydropsyche dicantha*	12 +
59500	*Oecetis sp*	4
60300	*Dineutus sp*	+
65800	*Berosus sp*	1
68601	*Ancyronyx variegata*	10
68708	*Dubiraphia vittata group*	+
68901	*Macronychus glabratus*	25 +
69200	*Optioservus sp*	+
69400	*Stenelmis sp*	1 +
70600	*Antocha sp*	+
71100	*Hexatoma sp*	+
77500	*Conchapelopia sp*	20
77750	*Hayesomyia senata or Thienemannimyia norena*	61 +
80370	*Corynoneura lobata*	4
81825	*Rheocricotopus (Psilocricotopus) robacki*	61
82141	*Thienemanniella xena*	4
82730	*Chironomus (C.) decorus group*	+
83040	*Dicrotendipes neomodestus*	183
84315	*Phaenopsectra flavipes*	20
84450	*Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)*	325 +
84470	*Polypedilum (P.) illinoense*	20
84750	*Stictochironomus sp*	+
85500	*Paratanytarsus sp*	41
85625	*Rheotanytarsus exiguus group*	913 +
85752	*Sublettea coffmani*	81
85800	*Tanytarsus sp*	20
85821	*Tanytarsus glabrescens group sp 7*	406
85840	*Tanytarsus guerlus group*	41
86100	*Chrysops sp*	+
86401	*Atherix lantha*	1 +
87540	*Hemerodromia sp*	5
95100	*Physella sp*	3
96900	*Ferrissia sp*	82
98600	*Sphaerium sp*	+

No. Quantitative Taxa: 41 Total Taxa: 64
No. Qualitative Taxa: 41 ICI: **50**
Number of Organisms: 3210 Qual EPT: 12

Ohio EPA/DSW Monitoring and Assessment Section
Macroinvertebrate Collection

Collection Date: 08/26/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 4.40

Taxa Code	Taxa	Quant/Qual
01320	*Hydra sp*	4
01801	*Turbellaria*	1 +
03040	*Fredericella sp*	1
03360	*Plumatella sp*	+
03600	*Oligochaeta*	54 +
05800	*Caecidotea sp*	+
08230	*Orconectes (Crokerinus) obscurus*	+
11130	*Baetis intercalaris*	1 +
12200	*Isonychia sp*	1 +
13400	*Stenacron sp*	275 +
13561	*Stenonema pulchellum*	114 +
13570	*Stenonema terminatum*	11
13590	*Stenonema vicarium*	11
16700	*Tricorythodes sp*	48 +
17200	*Caenis sp*	96
18100	*Anthopotamus sp*	+
18600	*Ephemera sp*	4 +
21200	*Calopteryx sp*	+
22300	*Argia sp*	+
24900	*Gomphus sp*	+
42700	*Belostoma sp*	+
45100	*Palmacorixa sp*	+
45300	*Sigara sp*	+
45400	*Trichocorixa sp*	+
47600	*Sialis sp*	+
51300	*Neureclipsis sp*	+
52200	*Cheumatopsyche sp*	36 +
52430	*Ceratopsyche morosa group*	95 +
52530	*Hydropsyche depravata group*	+
53800	*Hydroptila sp*	8
59001	*Leptoceridae*	4
67500	*Laccobius sp*	+
68025	*Ectopria sp*	+
68708	*Dubiraphia vittata group*	2 +
68901	*Macronychus glabratus*	25
69200	*Optioservus sp*	+
69400	*Stenelmis sp*	+
74501	*Ceratopogonidae*	+
77120	*Ablabesmyia mallochi*	+
77750	*Hayesomyia senata or Thienemannimyia norena*	51 +
77800	*Helopelopia sp*	10
78750	*Rheopelopia paramaculipennis*	10 +
80410	*Cricotopus (C.) sp*	61
80420	*Cricotopus (C.) bicinctus*	+
80430	*Cricotopus (C.) tremulus group*	31 +
81632	*Parakiefferiella n.sp 2*	30
82101	*Thienemanniella n.sp 1*	32 +
82141	*Thienemanniella xena*	6
82220	*Tvetenia discoloripes group*	+
83040	*Dicrotendipes neomodestus*	132 +
83820	*Microtendipes "caelum" (sensu Simpson & Bode, 1980)*	+
84450	*Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)*	132 +
84480	*Polypedilum (P.) laetum group*	+
84540	*Polypedilum (Tripodura) scalaenum group*	10
85261	*Cladotanytarsus vanderwulpi group Type 1*	+
85625	*Rheotanytarsus exiguus group*	92
85752	*Sublettea coffmani*	61
85821	*Tanytarsus glabrescens group sp 7*	418
85840	*Tanytarsus guerlus group*	41
87540	*Hemerodromia sp*	4
89716	*Limnophora discreta*	+
94400	*Fossaria sp*	+
95100	*Physella sp*	+
96900	*Ferrissia sp*	81

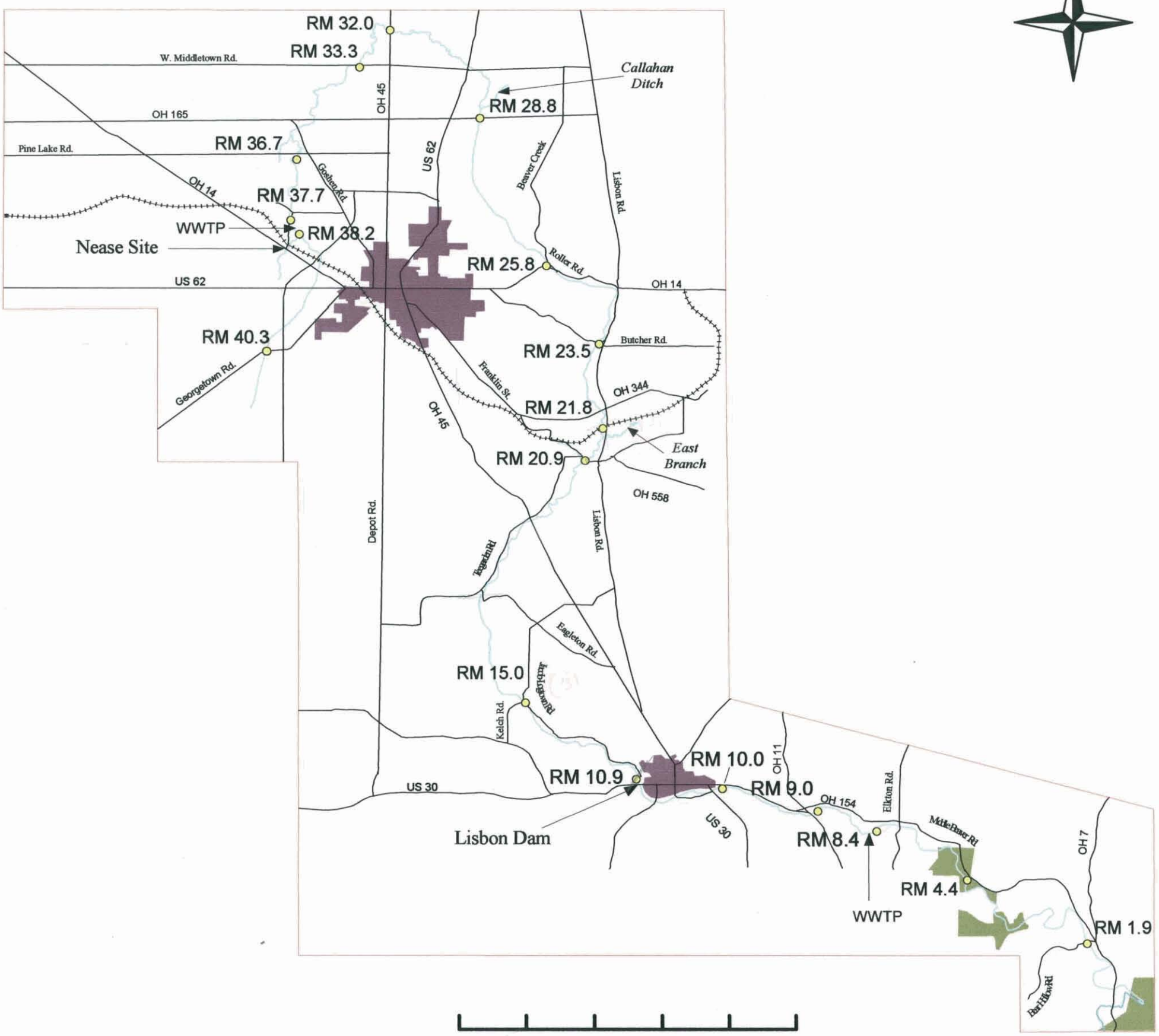
No. Quantitative Taxa: 36 Total Taxa: 64
No. Qualitative Taxa: 45 ICI: **40**
Number of Organisms: 1993 Qual EPT: 11

Ohio EPA/DSW Monitoring and Assessment Section
Macroinvertebrate Collection

Collection Date: 08/26/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 1.90

Taxa Code	Taxa	Quant/Qual
01418	*Craspedacusta sowerbyi*	16
03451	*Urnatella gracilis*	8
03600	*Oligochaeta*	283
05800	*Caecidotea sp*	+
06201	*Hyalella azteca*	+
06830	*Gammarus minus*	+
08230	*Orconectes (Crokerinus) obscurus*	+
11130	*Baetis intercalaris*	+
12200	*Isonychia sp*	+
13400	*Stenacron sp*	83 +
13561	*Stenonema pulchellum*	796 +
16700	*Tricorythodes sp*	236
17200	*Caenis sp*	155 +
18100	*Anthopotamus sp*	1
18600	*Ephemera sp*	1 +
21200	*Calopteryx sp*	+
22001	*Coenagrionidae*	+
22300	*Argia sp*	1 +
23804	*Basiaeschna janata*	+
23909	*Boyeria vinosa*	+
28955	*Libellula lydia*	+
45100	*Palmacorixa sp*	+
45400	*Trichocorixa sp*	+
47600	*Sialis sp*	1 +
48620	*Nigronia serricornis*	+
51300	*Neureclipsis sp*	2
52200	*Cheumatopsyche sp*	47 +
52430	*Ceratopsyche morosa group*	62 +
52530	*Hydropsyche depravata group*	2
53800	*Hydroptila sp*	34 +
60300	*Dineutus sp*	+
63300	*Hydroporus sp*	+
67500	*Laccobius sp*	+
68601	*Ancyronyx variegata*	+
68708	*Dubiraphia vittata group*	28 +
68901	*Macronychus glabratus*	22 +
69400	*Stenelmis sp*	+
70600	*Antocha sp*	+
72700	*Anopheles sp*	+
77120	*Ablabesmyia mallochi*	77
77750	*Hayesomyia senata or Thienemannimyia norena*	194 +
77800	*Helopelopia sp*	+
80420	*Cricotopus (C.) bicinctus*	39 +
80430	*Cricotopus (C.) tremulus group*	+
81240	*Nanocladius (N.) distinctus*	+
81465	*Orthocladius (O.) carlatus*	39
82101	*Thienemanniella n.sp 1*	116
82141	*Thienemanniella xena*	+
82220	*Tvetenia discoloripes group*	+
83040	*Dicrotendipes neomodestus*	426
84300	*Phaenopsectra obediens group*	39
84450	*Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)*	310 +
84460	*Polypedilum (P.) fallax group*	+
84470	*Polypedilum (P.) illinoense*	+
85261	*Cladotanytarsus vanderwulpi group Type 1*	116 +
85625	*Rheotanytarsus exiguus group*	310 +
85752	*Sublettea coffmani*	77 +
85821	*Tanytarsus glabrescens group sp 7*	2169 +
85840	*Tanytarsus guerlus group*	232
94400	*Fossaria sp*	+
95100	*Physella sp*	16 +
96900	*Ferrissia sp*	56 +
98600	*Sphaerium sp*	+

No. Quantitative Taxa: 33 Total Taxa: 63
No. Qualitative Taxa: 50 ICI: **42**
Number of Organisms: 5994 Qual EPT: 9



LEGEND

- Sampling Site
- RM 10.0 River Mile
- Roads
- Rivers
- West Fork Little Beaver Creek
- Railroads
- Municipal Areas
- Beaver Creek State Forest
- WWTP Waste Water Treatment Plant

REFERENCE

Base map provided by Davey Resource Group, Kent, Ohio

Figure 1

Middle Fork Little Beaver Creek 1999 Sampling Sites

File No. G6154-03
GIS By: MRM
Dated: 03/31/00

Golder Associates

FIGURE 2
MIDDLE FORK LITTLE BEAVER CREEK
INVERTEBRATE COMMUNITY INDEX (ICI)

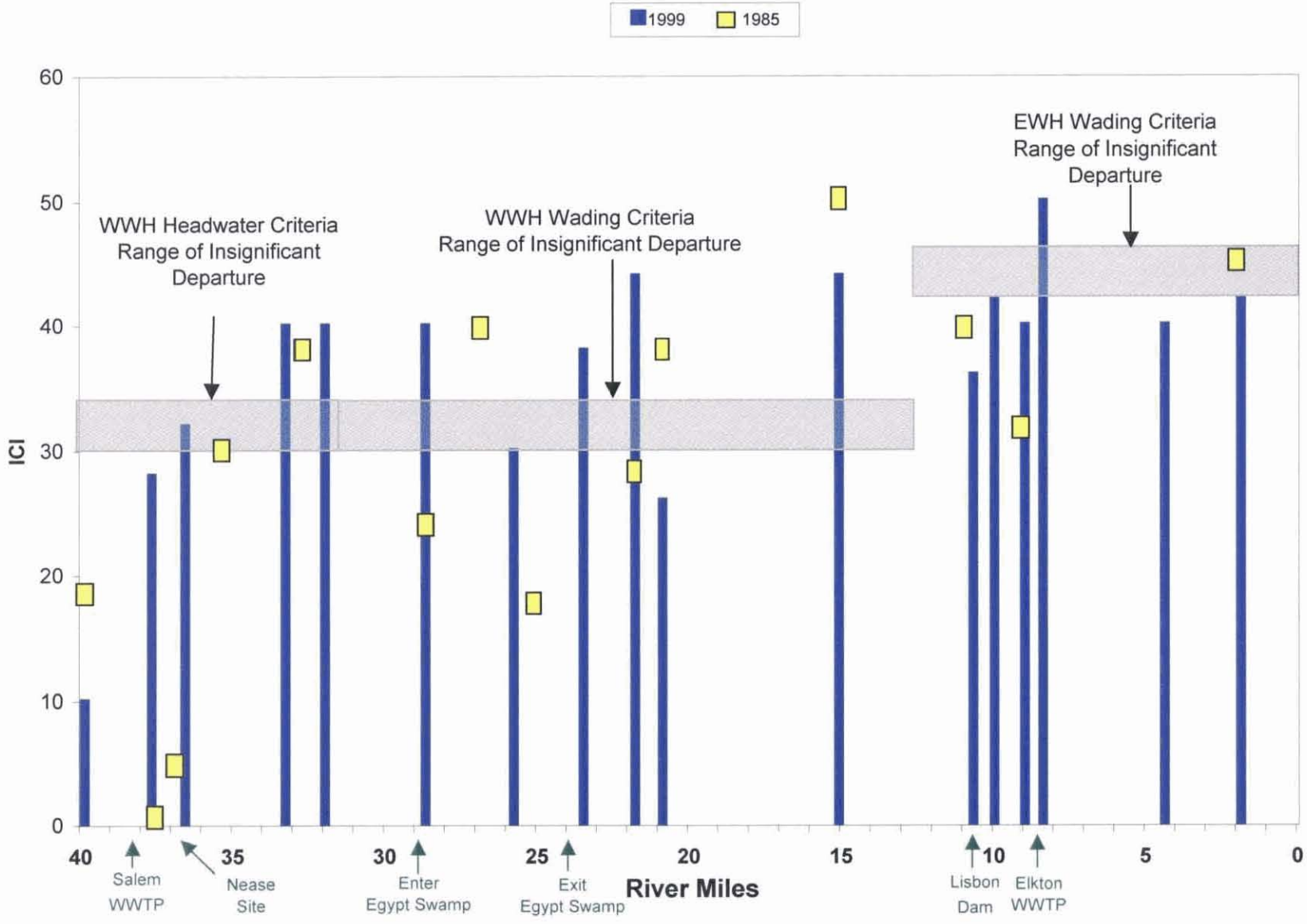


FIGURE 3
MIDDLE FORK LITTLE BEAVER CREEK
MODIFIED INDEX OF WELL-BEING (MI_{wb})

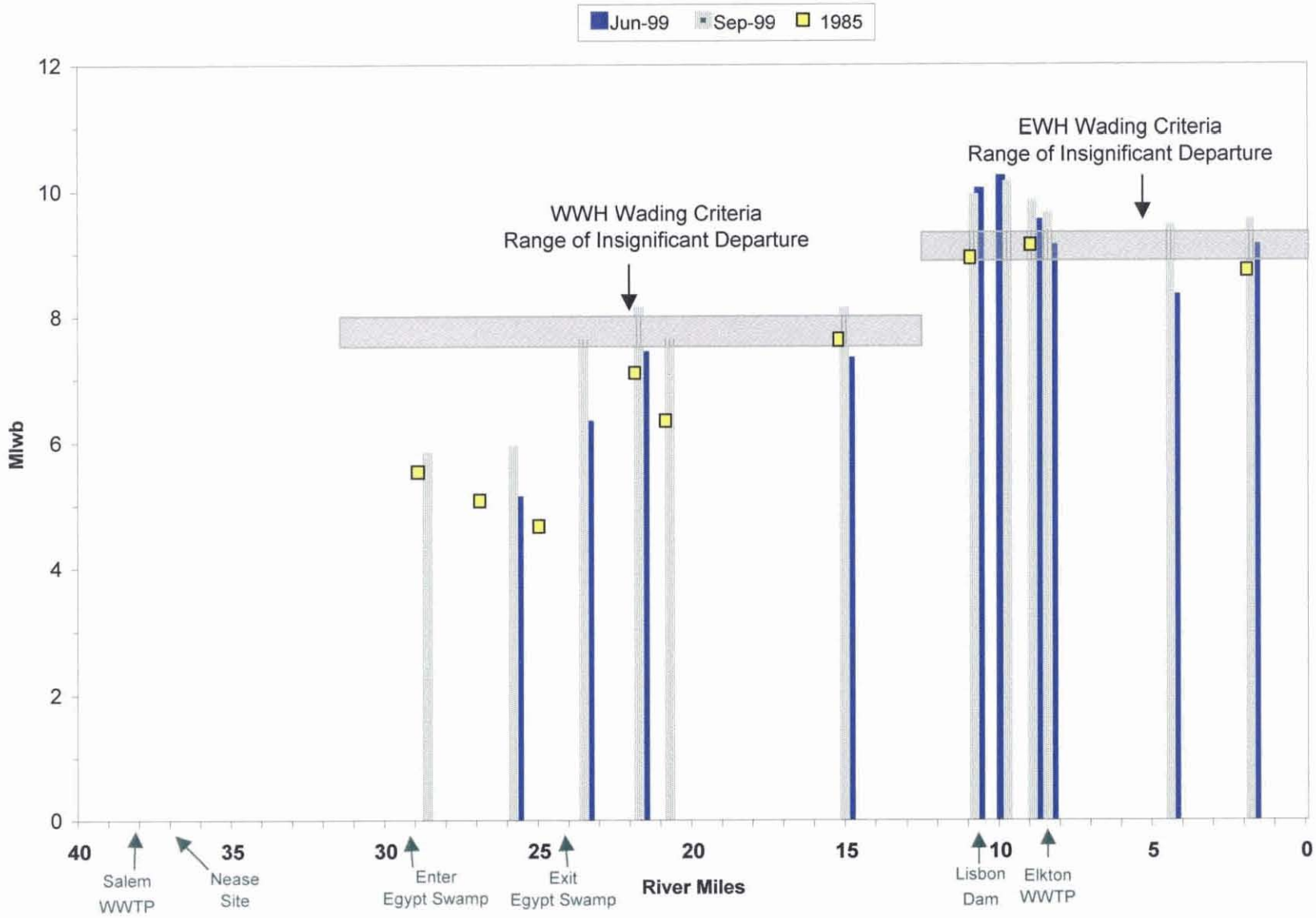


FIGURE 4
MIDDLE FORK LITTLE BEAVER CREEK
INDEX OF BIOTIC INTEGRITY (IBI)

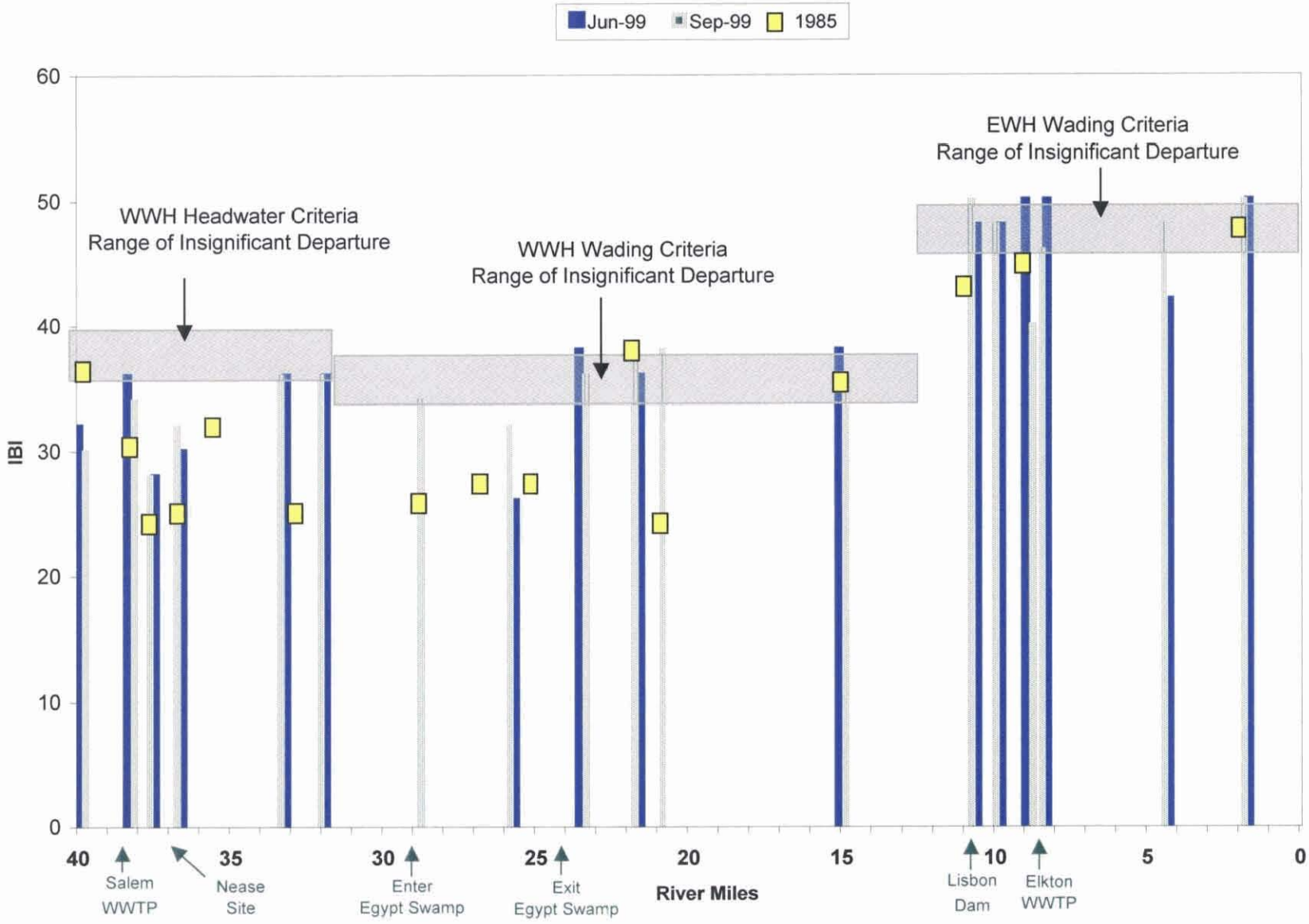


FIGURE 5
MIDDLE FORK LITTLE BEAVER CREEK
QUALITATIVE HABITAT EVALUATION INDEX (QHEI)

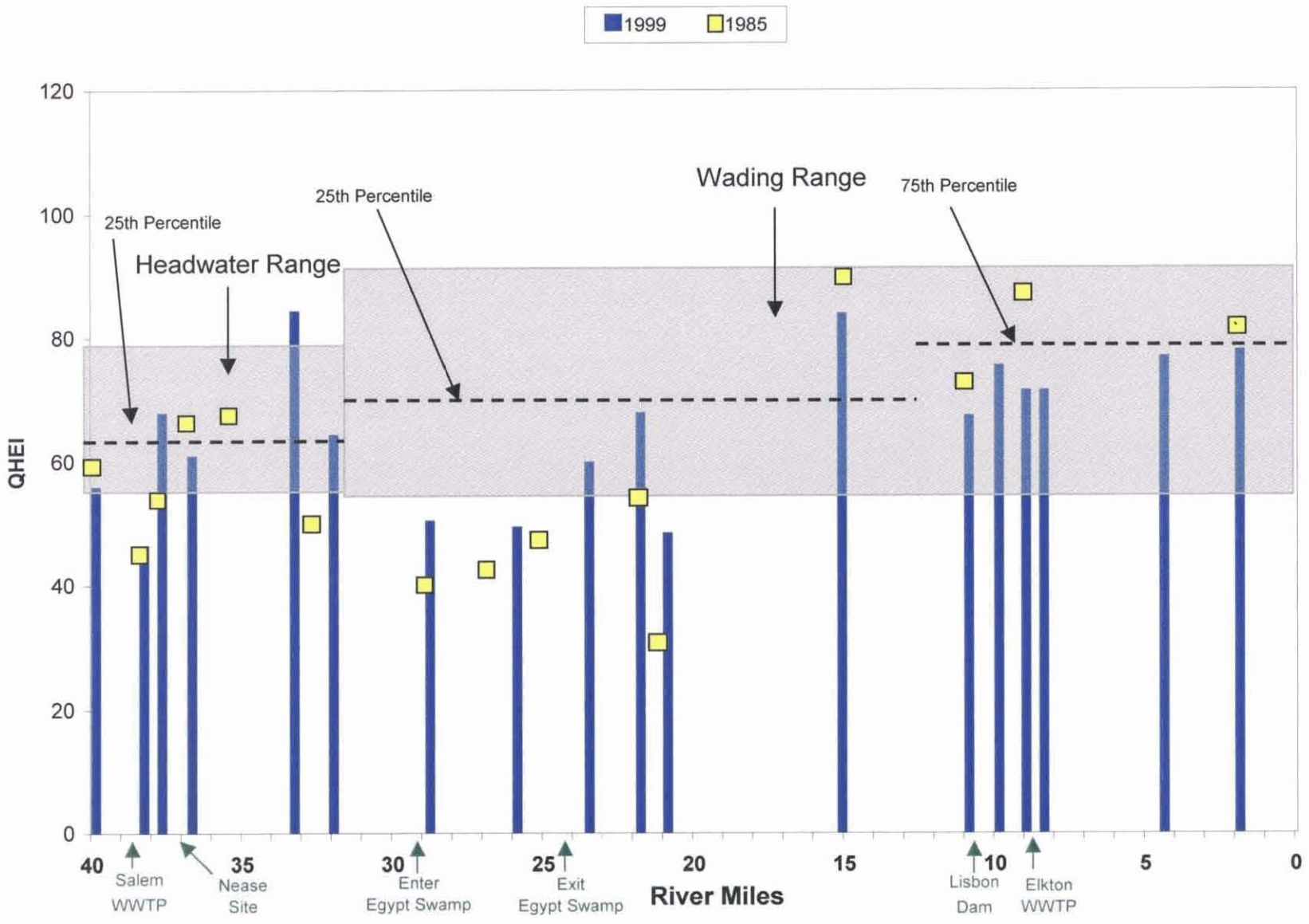


FIGURE 6
MIDDLE FORK LITTLE BEAVER CREEK
EDIBLE FISH MIREX LEVELS: 1999 DATA

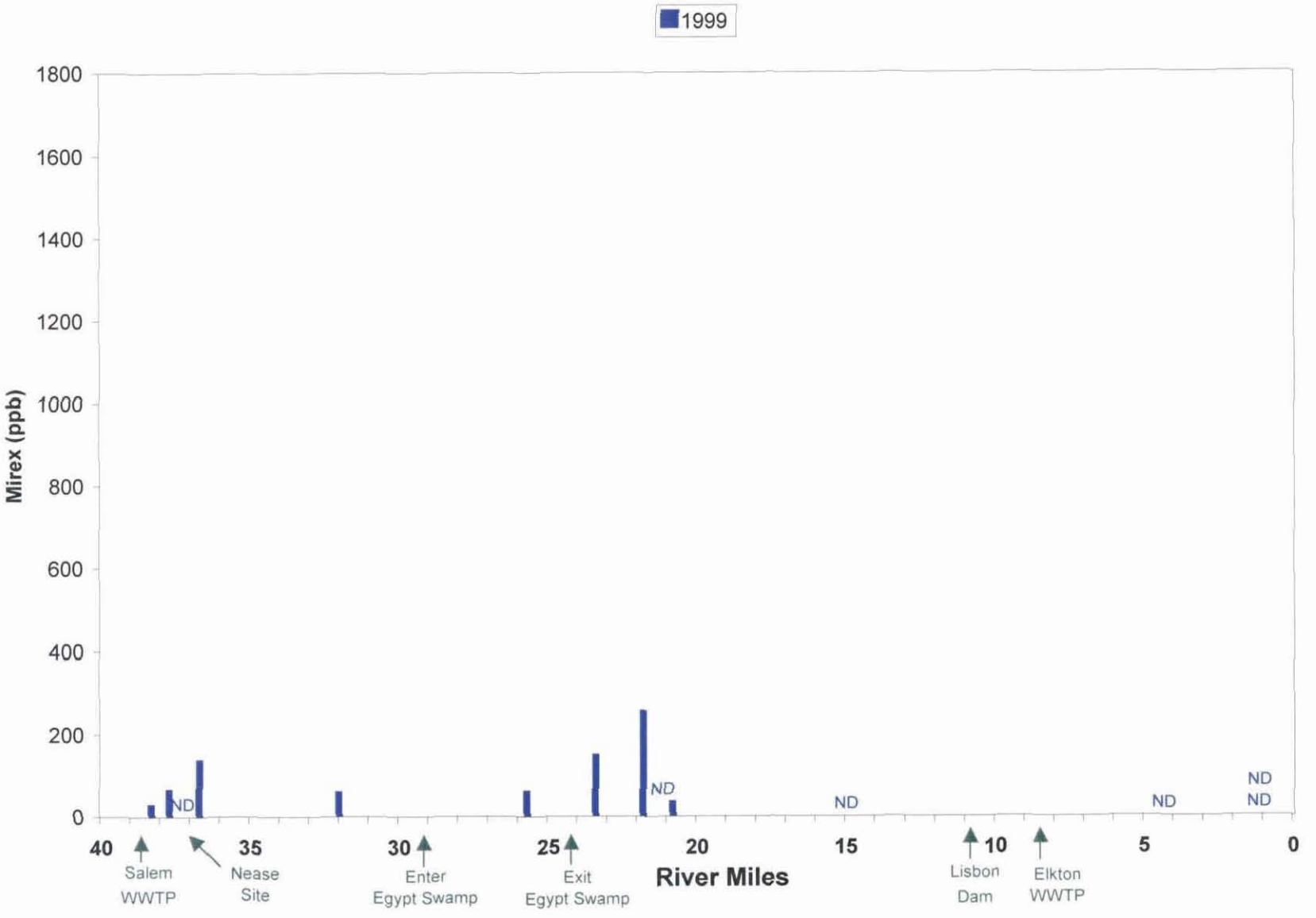


FIGURE 7
MIDDLE FORK LITTLE BEAVER CREEK
EDIBLE FISH MIREX LEVELS: RI DATA

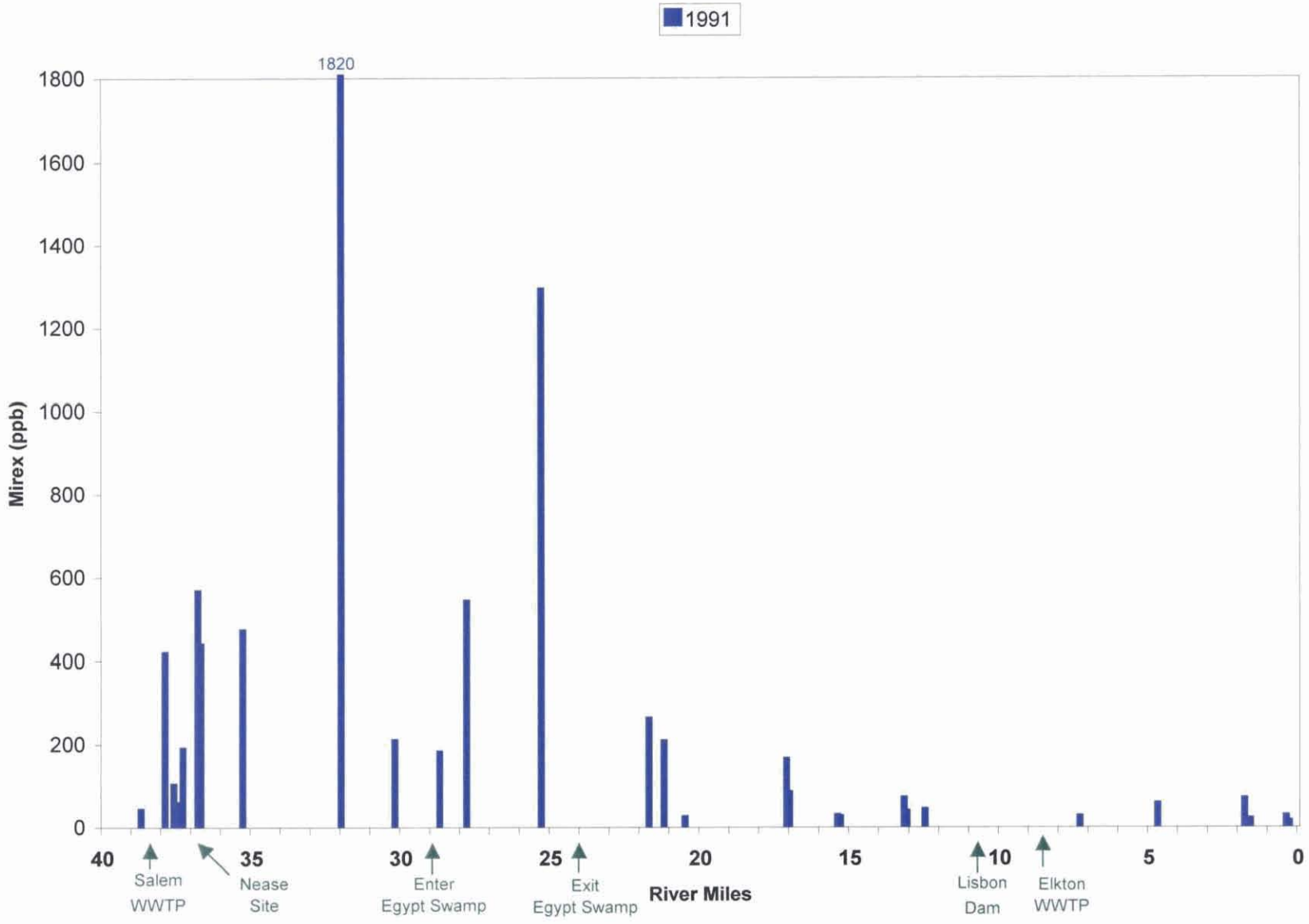


FIGURE 8
MIDDLE FORK LITTLE BEAVER CREEK
SEDIMENT MIREX LEVELS: 1999 DATA

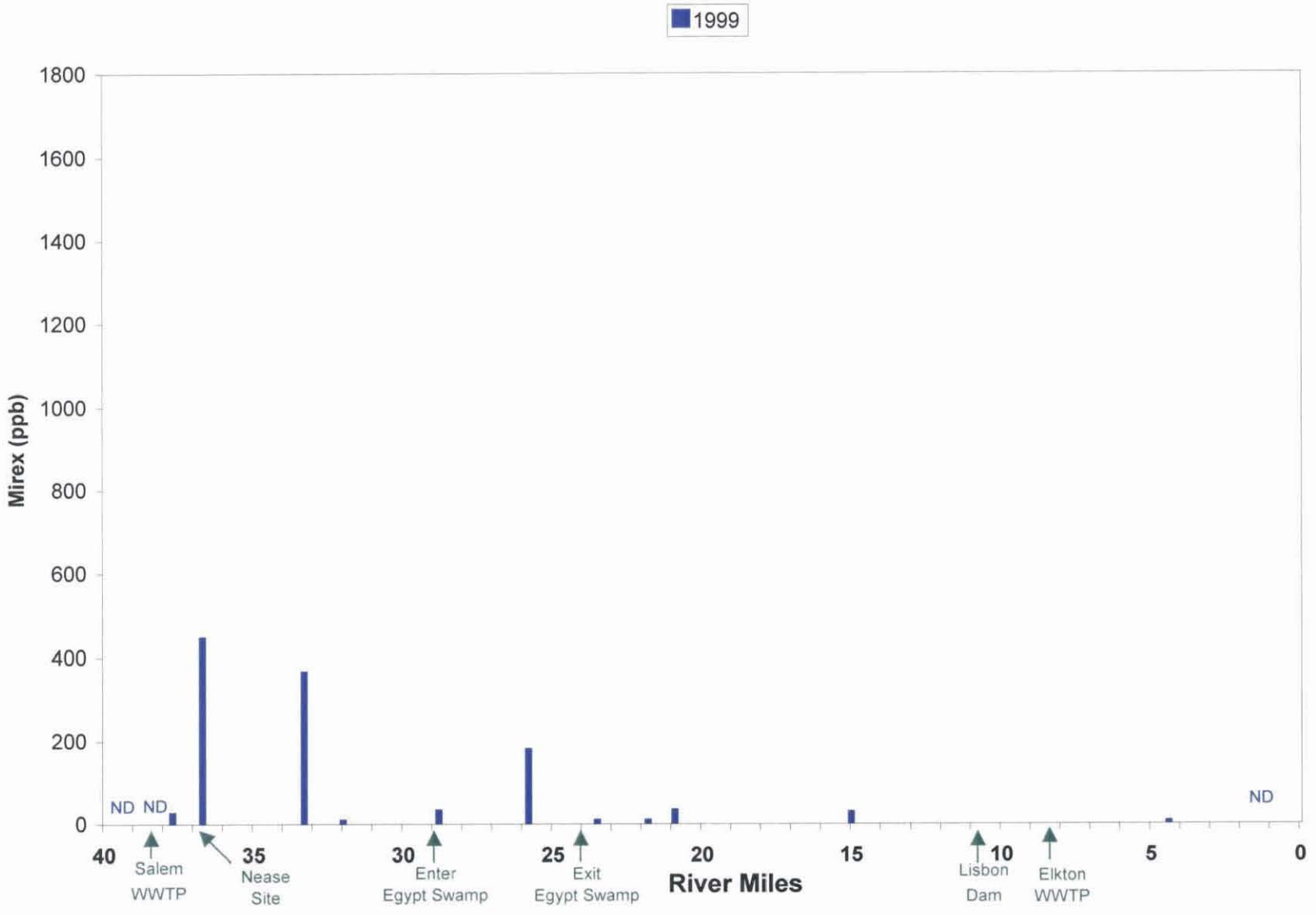
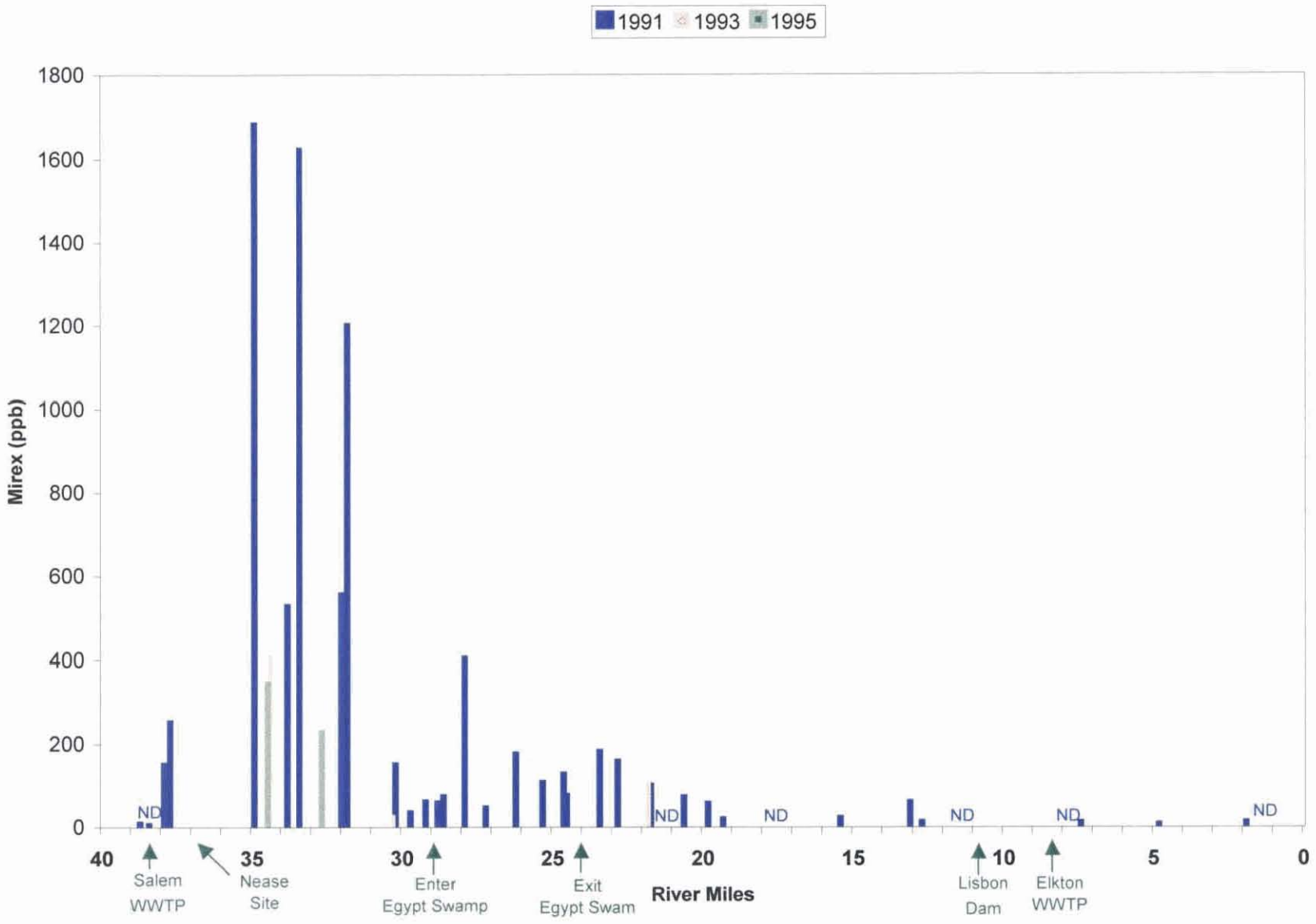


FIGURE 9
MIDDLE FORK LITTLE BEAVER CREEK
SEDIMENT MIREX LEVELS: RI DATA



APPENDIX A

MFLBC Focused Ecological Assessment Sampling Plan

MFLBC FOCUSED ECOLOGICAL ASSESSMENT SAMPLING PLAN

Introduction

This document describes the work elements to be undertaken by RUTGERS Organics Corporation (ROC) as part of the MFLBC Focused Ecological Assessment. The remaining components of the work, specifically aquatic community sampling to evaluate Ohio Biocriteria Indices, will be undertaken by the Ohio Environmental Protection Agency (OEPA) Division of Surface Water. Fieldwork will be conducted jointly by ROC's consultants and OEPA, commencing July 12, 1999, to ensure the representativeness and comparability of the data collected by the two groups.

Sampling Locations

The following sampling locations have been selected by OEPA and USEPA:

River Mile	Description
40.3	"Background"
38.3	Immediately downstream of Salem Wastewater Treatment Plant (WWTP), downstream historical discharges on Buttermilk Creek
37.8	Immediately downstream of Salem WWTP, upstream of Nease
36.7	Upper low flow area of MFLBC, immediately downstream of Nease
33.3	Upper low flow area of MFLBC (Middletown Road/upstream crossing)
31.3	Higher flowing area before Egypt Swamp
28.8	Open straight reach through Egypt Swamp
27.1	Lower area of Egypt Swamp
25.1	Faster moving segment in ravine
20.9	Open wider flood plain near Franklin Square
15.1	Forested ravine
9.0	Downstream of (old) WWTP
4.6	Intermediate location between River Miles 9 and 1.9
1.9	Sediment deposition area

Joint field reconnaissance will be conducted by ROC and the OEPA to select the exact sampling locations to ensure that the data is representative and that appropriate descriptions of the sampling locations, habitats and potential anthropogenic influences are recorded.

Fish Tissue Sampling and Analysis

Fish tissue will be collected from each of the above sampling locations for analysis of mirex, photomirex, and kepone. Sampling will follow Ohio EPA's Fish Tissue Consumption Monitoring Program (FTCMP) protocol[1].

Sediment Chemistry Sampling and Analysis

Sediment samples will be collected from each of the above sampling locations using the Agency-approved methodology used in all prior MFLBC sediment sampling by ROC (ERM-Midwest, March 1990). The protocol specifies collecting samples from the stream bottom to a depth of 6 to 8 inches using a clean stainless steel trier (cylindrical tube for soil recovery). Samples will be homogenized in a clean stainless steel bowl and placed in a laboratory-supplied amber glass jar. Samples will be analyzed for the following constituents:

- TCL - VOCs
- TCL - SemiVOCs
- TCL - Pesticides
- TAL - Metals
- Mirex, Photomirex, and Kepone
- Grain Size Analysis
- Total Organic Carbon

Surface Water Sampling and Analysis

Surface water samples will be collected from each of the above sampling locations using the Agency-approved methodology used in all prior MFLBC sampling by ROC (ERM-Midwest, March 1990). Parameters measured in the field will include:

- Temperature
- Dissolved Oxygen
- pH
- Total dissolved solids

Surface water samples will also be collected for laboratory analysis of the following parameters:

- Biological Oxygen Demand (BOD)
- Total suspended solids
- Nutrients (nitrogen series and phosphorus)

[1] Ohio Environmental Protection Agency (1994) *Fish Tissue Monitoring Program Guidance Manual: MAS/1994-11-1*

Quality Assurance

All sampling will be conducted under strict Quality Assurance procedures in accordance with the Agency-approved methodology used in all prior MFLBC sampling by ROC (ERM-Midwest, March 1990). Procedures will include:

- Field decontamination of all sampling equipment between each sampling location;
- Collection of field duplicate samples at the rate of one duplicate per twenty primary samples;
- Analysis of field blank samples at the rate of one per twenty samples;
- Analysis of laboratory blank samples;
- Analysis of matrix spike/matrix spike duplicate samples at the rate of one per twenty samples;
- Frequent calibration of all instruments used to collect field parameter measurements;
- Independent data validation of 100 percent of samples.

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APPENDIX B

Field Survey Report Middle Fork Little Beaver Creek

Field Survey Report

Middle Fork of Little Beaver Creek
Mahoning and Columbiana
Counties, Ohio

Prepared for

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Prepared by

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October, 1999

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INTRODUCTION

Davey Resource Group conducted field surveys along the Middle Fork of Little Beaver Creek (MFLBC) between July 12, 1999 and July 21, 1999. This report summarizes the scope of work, sample locations, field activities and results. Fieldwork was conducted by Dawn Nighman, Susan McCauslin, and Michael Johnson whose professional resumes are included with this report (Appendix A).

SCOPE OF WORK

The scope of work for this project followed guidelines and protocols prepared by Golder Associates, Inc., and approved by the United States Environmental Protection Agency (USEPA) Region V and the Ohio Environmental Protection Agency (EPA) (Appendix B). This scope included fish tissue, sediment and surface water sampling at each of fourteen sample locations.

In addition to the scope identified in the Workplan (Appendix B), Davey Resource Group biologists coordinated with Ohio EPA to collect additional data to address the recreational value of the fisheries at each sample site. Additional data included the lengths and individual weights of each species considered to have recreational or commercial value as identified by Davey Resource Group (1997).

At each site, Davey Resource Group field scientists coordinated sampling efforts with the Ohio EPA and United States EPA to reach consensus regarding the location where sediment samples were taken and the species of fish that were sacrificed for tissue analysis. Samples were collected in conformance with the protocol set forth in the Workplan (Appendix B).

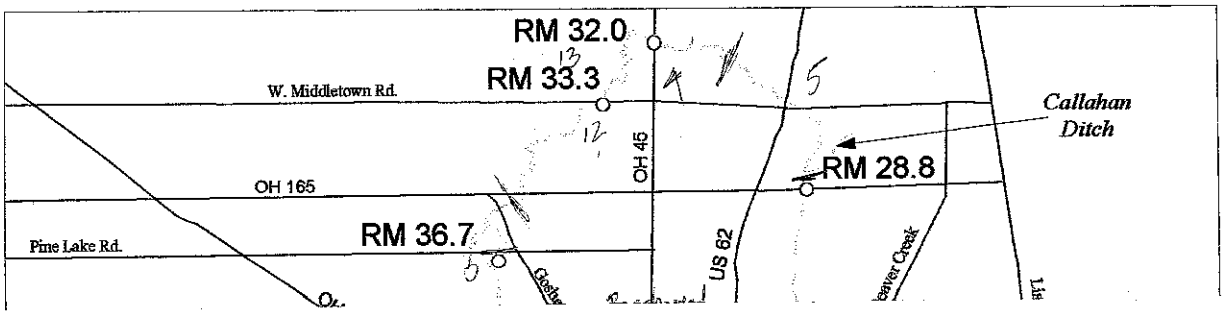
SAMPLING LOCATIONS

Table 1 lists all sites that were sampled for the parameters identified in the Workplan prepared by Golder Associates (Appendix B). Figure 1 shows the locations of sample sites. The locations of some of the sample sites differ slightly from the original Workplan because it was necessary to adjust some sampling sites due to limited equipment access as well as differing sampling objectives. The original intent of most sites generally remained the same.

Table 1: Location of Sample Sites - MFLBC

Rivermile	Description	Geographic Reference
40.3	Background	Georgetown Road
38.3	Upstream of Salem WWTP	Salem Industrial Park
37.7	Downstream of Salem WWTP	Allen Road
36.7	Upper low flow area	Pine Lake Road
33.3	Upper low flow area	Middletown Road
32.0	Higher flow area	Ohio 45
28.8	Upper reach of Egypt Swamp	Ohio 165
25.8	Lower reach of Egypt Swamp	Beaver Creek Road
23.5	Faster flowing segment	Butcher Road
21.8	Upstream of East Branch tributary	Lisbon-Canfield Road
20.9	Downstream of East Branch tributary	Ohio 558
15.0	Forested ravine area	Kelch Road
4.4	Intermediate location	Lusk Lock Road
1.9	Sediment deposition area	Bear Hollow Road

Figure 1. Middle Fork Little Beaver Sample Sites



- Roads
- Rivers
- West Fork Little Beaver Creek
- Railroads
- Municipal Areas
- Beaver Creek State Forest
- WWTP Waste Water Treatment Plant

DAVEY RESOURCE GROUP
A Division of The Davey Tree Expert Company

SITE DESCRIPTIONS

RM 40.3 @ Georgetown Road (Photograph 1, Appendix F)
This is the uppermost headwater site selected for sampling. Surrounding land use is residential with lawn and landscape planting extending to the edge of the stream. The site is dominated by pool habitats and the benthic substrates are composed of fine sediments and organic matter.

RM 38.3 @ Salem Industrial Park (Photograph 2, Appendix F)
This site is located just upstream of the Salem Wastewater Treatment Plant (WWTP) discharge pipe. Surrounding land use is wooded and industrial, and the riparian zone has been recently disturbed. The site supports riffles, runs, and pools within the creek. Benthic substrates are composed of fine sediments and organic matter.

RM 37.7 @ Allen Road (Photograph 3, Appendix F)
This site is located just downstream of the Salem WWTP. The surrounding landscape is primarily wooded and most of the riparian area is buffered by tree canopy. Riffles, runs, and pools are all present and cobbles and gravel compose the majority of the benthic substrates. Fine sediments and organic matter are restricted to the slower moving pool areas.

RM 36.7 @ Pine Lake Road (Photograph 4, Appendix F)
This site supports well-developed riffles, runs, and deep pools. Gravel and a few cobbles compose the benthic substrates of the swifter flowing areas while fine sediments have settled in the slower pools. Overall, the presence of silt was noted to be unusually high for this area and may impact fish communities. The surrounding landscape is primarily natural and the stream is buffered by vegetation and tree canopy.

RM 33.3 @ Middletown Road (Photograph 5, Appendix F)
This site supports a well-developed riffle, run, and pool complex. Gravel dominates the swifter flowing areas and fine sediments are restricted to slower flowing areas. The surrounding landscape is primarily natural and the stream is buffered by vegetation and tree canopy.

RM 32.0 @ Ohio 45 (Photograph 6, Appendix F)
This site supports a poorly developed riffle, run, and pool complex. The majority of the stream is very shallow and overhanging vegetation provides the best refuge for fish species. The surrounding landscape is primarily natural and the stream is buffered by tree canopy. The majority of the streambed is composed of fine sediments with a few areas of gravel and cobble.

RM 28.8 @ Ohio 165 (Photograph 7, Appendix F)
This site represents the upper reach of Egypt Swamp and is dominated by pool habitats. The area appears to have been historically channelized and the surrounding land use is natural and residential. Benthic substrates are primarily fine sediments and organic matter.

RM 25.8 @ Beaver Creek Road (Photograph 8, Appendix F)
This site represents the lower reach of Egypt Swamp and is characterized by slow flowing water, fine sediments, and ample macrophyte growth. The area appears to have been historically channelized and dredged which may account for the limited instream habitat. Channelization decreases the diversity of habitats available to fish and aquatic wildlife.

RM 23.5 @ Butcher Road (Photograph 9, Appendix F)
As the Middle fork exits Egypt Swamp, velocities increase and sediment deposition decreases. This site still maintains deep pools with fine sediments but several well-developed riffles and runs begin to form in this area.

RM 21.8 @ Lisbon-Canfield Road (Photograph 10, Appendix F)
This site is located just upstream of the East Branch tributary to the Middle Fork and is characterized by long, deep pools with fine-grained sediments. A few well-developed riffles and runs can be found here which provide habitat for a greater variety of fish species.

RM 20.9 @ Ohio 558 (Photograph 11, Appendix F)
This site is located downstream of the East Branch tributary in the vicinity of Franklin Square. It is highly channelized with deep deposits of fine sediments and organic material. There is little protective effect from surrounding vegetation and most of the stream is exposed to full sunlight.

RM 15.0 @ Kelch Road (Photograph 12, Appendix F)
This site flows through a forested ravine and supports well-developed riffles, runs, and pools. Sediments are composed of gravel and cobbles in the swifter flowing areas and fine sediments in the slower flowing areas.

RM 4.4 @ Lusk Lock Road (Photograph 13, Appendix F)
This site is located within the confines of the State Forest and supports the best instream habitat noted during this survey. There are well-developed riffles and runs composed of boulders, cobbles, and gravel. Several deep pools are present with benthic substrates of fine sediments and organic matter. Riparian vegetation is natural and most of the site supports successional or mature tree canopy. Despite the diversity of habitats and benthic substrates, siltation was noted to be greater than normally expected.

RM 1.9 @ Bear Hollow Road (Photograph 14, Appendix F)
This is the furthest sampling site located downstream on the Middle Fork, within this study. Most of the area is dominated by pool habitats although a single riffle area was observed at the downstream end of this sample site. Benthic substrates are composed of cobbles and gravel with some depositional areas of fine sediments. The surrounding land use is residential and natural.

DEVIATIONS FROM WORKPLAN

Several deviations were made from the original Workplan, with respect to field activities, and they include the following:

Site Selection - Several of the sites selected for sampling deviated slightly from the original Workplan as previously described. Most deviations were minor and the original intent of site selection remained unchanged with two exceptions: RM 9.0 located downstream of the abandoned wastewater treatment plant (WWTP) in the Lisbon area was initially identified for sampling by Golder Associates; however, Ohio EPA did not sample this site as part of this study. Ohio EPA plans to sample this site as part of another, unrelated study. In addition, RM 21.8 was added to determine the effect of the East Branch tributary on the biota of the Middle Fork; this site was not identified in the original Workplan. This tributary carries wastewater effluent from the communities of Washingtonville and Leetonia and this site was intended to identify the potential impact of this tributary on the water quality of the Middle Fork.

Sample Storage - Some of the samples were shipped to the laboratory with sealed bags of ice cubes, as opposed to solely using "blue ice" as is called for in the Workplan. This substitution was made because the temperature of samples transported in the first shipment of coolers to the laboratory were too low.

Fish Tissue Collection

Davey Resource Group followed Ohio EPA guidelines as identified in the Workplan (Appendix B). Ohio EPA protocols indicate that at each site, an effort should be made to sample the same species of fish for comparison of results between sites. However, sampling should also be biased to collect the dominant game species at each site as these fish are more likely to be consumed by anglers. The later criterion is considered more important than the consistency of selecting the same species between sites (Dave Altvater, personal communication). At each site, Davey Resource Group and Ohio EPA biologists selected individual specimens for tissue sampling. In a few instances (RM's 20.9, 23.5, 25.8, and 37.7) consensus was not achieved concerning which species and individuals would most likely be considered preferable by anglers. In these situations, two samples were collected to accommodate the best professional judgment of both Ohio EPA and Davey Resource Group biologists.

RESULTS OF FIELD SURVEYS

Tables 2-5 summarize information regarding all of the samples collected. Table 6 summarizes water quality measurements taken during the collection of surface water samples.

Table 2. Fish Tissue Sample Log - MFLBC

Collection Date	River-mile	Sample #	Type of fish	Time	Ship Date	Skin on	Skin off	# of Fish
7/15	1.9	FT19A	Smallmouth bass	4:00 pm	7/21	X		1
7/15	1.9	FT19B	Channel cat	4:00 pm	7/20		X	1
7/15	4.4	FT50	Smallmouth bass	3:00 pm	7/20	X		2
7/15	15.0	FT150	White sucker	11:00 am	7/20	X		2
7/14	20.9	FT209A	Largemouth bass	8:00 pm	7/15	X		1
7/14	20.9	FT209B	Bluegill	8:00 pm	7/15	X		6
7/14	21.8	FT218	Rock bass	6:00 pm	7/15	X		2
7/14	23.5	FT235A	Carp	3:00 pm	7/14		X	2
7/14	23.5	FT235B	Bluegill	3:00 pm	7/14	X		4
7/14	25.8	FT258A	Carp	11:30 am	7/14		X	2
7/14	25.8	FT258B	White sucker	11:30 am	7/14	X		2
7/13	28.8	FT288	Carp	7:30 pm	7/14		X	2
7/13	32.0	FT320	White sucker	6:00 pm	7/14	X		4
7/13	33.3	FT333	Carp	12:30 pm	7/13		X	2
7/13	36.7	FT367	White sucker	10:00 am	7/13	X		2
7/12	37.7	FT378A	Yellow bullhead	9:00 pm	7/13		X	2
7/12	37.7	FT378B	White sucker	9:00 pm	7/13	X		3
7/12	38.3	FT383	Yellow bullhead	4:00 pm	7/12		X	2

- Note RM 40.3 did not yield any fish of suitable size for tissue sampling.

Table 3. Surface Water Sample Log - MFLBC

Collection Date	Rivermile	Sample #	Time	Ship Date
7/20	1.9	SW19	9:20 am	7/20
7/20	4.4	SW45	11:00 am	7/20
7/20	4.4	SW54 (duplicate)	11:00 am	7/20
7/20	15.0	SW150	3:00 pm	7/20
7/20	20.9	SW209	5:00 pm	7/20
7/20	21.8	SW218	5:30 pm	7/20
7/21	23.5	SW235	9:40 am	7/21
7/21	25.8	SW258	10:20 am	7/21
7/21	28.8	SW288	10:50 am	7/21
7/21	32.0	SW320	11:50 am	7/21
7/21	33.3	SW333	12:00 pm	7/21
7/21	36.7	SW367	2:00 pm	7/21
7/21	37.7	SW378	2:40 pm	7/21
7/21	38.3	SW383	3:10 pm	7/21
7/21	38.3	SW838 (duplicate)	3:10 pm	7/21
7/21	40.3	SW403	3:45 pm	7/21

Table 4. Sediment Sample Log - MFLBC

Collection Date	Rivermile	Sample #	Time	Ship Date
7/20	1.9	SD19	9:20 am	7/20
7/20	4.4	SD45	11:00 am	7/20
7/20	4.4	SD54 (duplicate)	11:00 am	7/20
7/15	15.0	SD150	9:00 am	7/15
7/15	15.0	SD105 (duplicate)	9:00 am	7/15
7/14	20.9	SD209	7:00 pm	7/15
7/14	21.8	SD218	4:00 pm	7/14
7/14	23.5	SD235	2:00 pm	7/14
7/14	25.8	SD258	9:00 am	7/14
7/14	25.8	SD852 (duplicate)	9:00 am	7/14
7/13	28.8	SD288	7:00 pm	7/14
7/13	32.0	SD320	3:30 pm	7/13
7/13	33.3	SD333	12:30 pm	7/13
7/13	36.7	SD367	9:00 am	7/13
7/13	36.7	SD763 (duplicate)	9:00 am	7/13
7/12	37.7	SD378	4:30 pm	7/12
7/12	38.3	SD383	2:30 pm	7/12
7/12	38.3	SD838 (duplicate)	2:30 pm	7/12
7/12	40.3	SD403	11:45 am	7/12

Table 5. Field Blank Sample Log - MFLBC

Collection Date	Rivermile	Sample #	Time	Ship Date
7/20	4.4	FB720	2:00 pm	7/20
7/15	15.0	FB715	10:00 am	7/15
7/14	25.8	FB714	11:30 am	7/14
7/21	28.8	FB721	11:00 am	7/21
7/13	36.7	FB713	9:30 am	7/13
7/12	38.3	FB712	3:00 pm	7/12

Table 6. Water Quality Measurements - MFLBC

Collection Date	Rivermile	Temperature (°C)	Dissolved Oxygen (mg/L)	pH (s.u.)	Total Dissolved Solids (mg/L)	Conductivity (µs)	Flow Velocity (ft/s)
7/20	1.9	26.7	9.3	6.87	508	1038	0.62
7/20	4.4	26.6	9.9	7.91	534	1999	1.0
7/20	15.0	27.3	17.8	8.49	542	1072	0.30
7/20	20.9	30.1	13.7	7.18	736	1457	0.20
7/20	21.8	30.0	18.4	8.42	942	1847	0.30
7/20	23.5	24.3	8.8	7.82	1180	2360	0.30
7/20	25.8	23.8	8.2	7.85	1250	2440	0.56
7/20	28.8	25.2	8.0	7.95	1500	2960	0.30
7/20	32.0	24.6	7.8	8.14	713	1362	0.56
7/20	33.3	24.5	9.4	8.12	803	1578	0.67
7/20	36.7	26.8	8.6	7.95	1230	2420	0.48
7/20	37.7	27.0	10.7	7.69	1300	2550	0.83
7/20	38.3	29.2	15.9	8.35	387	776	0.30
7/20	40.3	28.2	13.6	8.33	282	552	N/A

EVALUATION OF RECREATIONAL FISHERIES

Davey Resource Group biologists worked with Ohio EPA to collect additional data to address the recreational value of the fisheries at each sample site. Additional data included the lengths and individual weights of each species considered to have recreational or commercial value as identified in Davey Resource Group (1997). Interpretation of data is based in the numbers of fish and size of individuals. Raw data is presented in Appendix C. A summary of results based on length data is presented in Table 7. In addition, species were divided into three categories of recreational value and described in Davey Resource Group (1997) and outlined below.

Class A species are game fish that are considered carnivores and piscivores. These top trophic predators usually attain the largest sizes, provide dramatic escape responses to anglers, and provide the most available flesh per individual fish. Species of the Middle Fork included in this category are smallmouth bass, largemouth bass, rock bass, warmouth sunfish, grass pickerel and grass pickerel x chain pickerel hybrids. Although rainbow and brown trout were found during the Remedial Investigation conducted by Ruetgers-Nease consultants (Ruetgers-Nease Corporation, 1996), these fish were rare and only found at one station downstream of the Lisbon Dam. These fish are not native to the eastern United States and their presence in the Middle Fork is most likely an accidental migration from portions of the Beaver Creek drainage in Pennsylvania that are stocked and managed as trout fisheries (Pennsylvania Fish & Boat Commission, 1997).

Class B species are game fish that are smaller in size and typically non-carnivorous in nature. Although smaller, these middle trophic species can be more abundant than Class A species. With the possible exception of channel catfish, these fish tend to offer less resistance to anglers resulting in less dramatic captures and generally provide less flesh per individual fish. Species of the Middle Fork included in this category are channel catfish, black crappie, bluegill sunfish, pumpkinseed sunfish, bowfin, and yellow perch.

Class C species are those fish that are only marginally considered recreational game species. Although these fish can be quite large, provide dramatic angling, and provide large amounts of flesh per individual fish, they are typically avoided by most anglers. These species are rarely managed in most recreational fisheries and are often considered undesirable as they can compete with Class A and B game fish for food and other resources. Fish species of the Middle Fork included in this category are bullhead catfish (yellow, brown, and black), white sucker, freshwater drum, and common carp.

Table 7. Summary of Recreational Fisheries Data - MFLBC.

	RM 40.3			RM 38.8			RM 37.8			RM 36.7			RM 33.3			RM 32.0			RM 28.8			RM 25.8			RM 23.5			RM 21.8			RM 20.9			RM 15.0			RM 4.5			RM 1.9		
	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L
CLASS A																																									
Smallmouth Bass																																			1	3	5			1
Largemouth Bass							1												1			3			1						1		1	1							
Grass Pickeral																			2	1		4					1	1														
Rock Bass																												4	4	2	2			1				1				
Sauger																																									1	
CLASS B																																									
Bluegill Sunfish				3			9			4									1			3			8						8	1					2			2	1	
Green Sunfish							2			2			3						8			3															1			2		
Pumpkinseed Sunfish	1						4									1			2			1			3																
Black Crappie																									1							1										
Channel Catfish																																									1	
CLASS C																																									
White Sucker	19	2		19			53	49	28	48	65	13	15	16	6	21	5	5	3	1	7	7	4	25	1		2	2	3	13	2	1	9	13	8	7		1	2	1		
Hog Sucker																	5					1	1	1	2	1	9	4	1	7	4		2	2	7	17	1	2	7			16
Silver Redhorse Sucker																																				1					1
Black Redhorse Sucker																																				3					15
Golden Redhorse Sucker																																				1					3
Freshwater Drum																																				8					2
Common Carp																					3			4			6									8					4
Yellow Bullhead				3	1		2	1						3			1	1			1		1	1			1		3		1		1								2
Brown Bullhead																															1										

S = Small < 6"
M = Medium 6"-8"
L = Large > 8"

Narrative Description of Results

The overall results of this survey generally agree with the *Study of Recreational Use* conducted by Davey Resource Group (1997). The upper areas of the Middle Fork (RM 40.3 - RM 25.8) were evaluated as unsuitable for recreational fisheries based upon a habitat survey and evaluation of existing secondary source data. Few Class A or Class B species are found at these sites and the few that do occur are in the small or medium size range. Although these areas may not support the trophy species associated with most desirable recreational fisheries, some sites do support extensive populations of Class C species; many of which are larger individuals. The most common Class C species is white sucker, which is commonly harvested in rural areas during spring mating runs.

RM 23.5 is located in a stretch of stream that was previously identified as being of marginal value in terms of recreational fishing. Although this site is still dominated by Class C species, a single large Class A species was captured during this survey.

RM 21.8 and RM 20.9 are located in a stretch of stream that was previously evaluated as unsuitable in terms of its use as a recreational fishery. However, the current data suggest a better fishery than previously anticipated. Both of these sites yielded several Class A species including a healthy population of rock bass.

RM 15.0 was previously identified as being ideal for use as a recreational fishery but the current data suggest a lower value that anticipated. No Class B and only a few, smaller Class A species were noted during this survey. However, this site still supports a healthy community of Class C species of all size classes.

RM 4.5 and RM 1.9 fall within a stretch of stream that was identified in the 1997 Davey study to be ideal for use as a recreational fishery and the data collected during this survey support that classification. Although Class C species still dominate the overall recreational community, there are several Class A and Class B species of all size ranges. RM 4.5 is particularly significant as it is the first site that smallmouth bass are present. Smallmouth bass are widely considered the most important recreational species in the entire Little Beaver drainage.

POTENTIAL SOURCES OF IMPARMENT

Throughout the course of this investigation, several sources were noted that might impact the health and quality of the aquatic communities. These can be divided into categories as described below.

Municipal and Industrial

There are several sources of pollution that can adversely affect the quality of water, fish and macroinvertebrate communities, and recreational potential of the Middle Fork of Little Beaver Creek. The municipalities of Salem and Elkton each have a wastewater treatment facility that discharges directly into the Middle Fork. The plant in Elkton is new and located directly upstream from the Elkton Road bridge. The City of Lisbon recently tied into this new facility, closing down their older treatment plant. The municipalities of Washington and Leetonia both maintain wastewater treatment facilities that discharge into Valley Run. Valley Run eventually becomes the East Branch and discharges into the Middle Fork near RM 22. One of the greatest impacts often associated with these facilities is a lowering of dissolved oxygen downstream of the effluent discharge. The data presented in Table 6 indicate that this is indeed the case concerning the Salem WWTP. Dissolved oxygen concentrations fall sharply just downstream of the discharge and continue for some length downstream.

In addition to municipal discharges, there are nine coal mining/production operations that discharge directly into the Middle Fork, a plastics operation, a steel fabricating

operation, and several miscellaneous dischargers that use the Middle Fork as a receiving body. A list of these dischargers is presented in Appendix D.

Erosion and Sedimentation

Sedimentation is considered a serious pollution problem in many streams. Silt and fine sediments settle on the stream bottom and suffocate the eggs and larvae of fish and other aquatic organisms. During the course of this investigation, there were many sites where silt and fine sediments were noted to be more than normally expected and potentially problematic. High sediment loads were prominent at RM 4.4 and RM 1.9. Likely contributors to sedimentation at these sites include the sand and gravel mining operation in the City of Lisbon (Photograph 15, Appendix F), local development and land clearing (Photograph 16, Appendix F), as well as the intensive agriculture within the watershed (Photograph 17, Appendix F).

Channelization and Dredging

Channelization decreases the diversity of habitats available to fish and aquatic wildlife. Channelization typically replaces naturally occurring habitat features such as riffles, runs, and pools with a homogenous environment dominated by pool or glide habitat. Channelized streams typically are exposed to direct sunlight, and combined with the absence of riffles, are often lower in oxygen concentrations. Channelization and dredging restrict the meandering nature of streams and lock them into narrow courses. Channelization and dredging also prevent streams from having ready access to associated floodplains which can have negative impacts on fish and riparian wildlife that rely on these associated habitats for all or part of their life cycle. RM 28.8 through RM 20.9 has been severely modified in this manner.

Fish Migration Barriers

Physical barriers are often serious impediments to fish communities in small streams and creeks. Headwater sites are usually too small to allow most fish to overwinter. Most of the larger game species spend the winter months in larger streams and tributaries. In spring and early summer, some of these fish may venture into the more headwater sites for spawning and seasonal residence in the deeper pools (Schlosser, 1982). Physical barriers that can exclude migratory species from upstream sites can include artificial structures such as culverts and dams as well as natural waterfalls and beaver impoundments. Any structure that restricts the free movement of fish is likely to reduce or eliminate certain top level predators from areas upstream of the barrier. This has especially been noted for smallmouth bass which seasonally migrate into headwater sites for spring reproduction (Trautman, 1981). There are numerous culverts that might restrict fish movements along the Middle Fork. However, the dam in the City of Lisbon is probably the most serious and notable barrier (Photograph 18, Appendix F). Smallmouth bass is a highly migratory species with important recreational value. Despite the presence of suitable habitat, this species has never been documented above the Lisbon Dam.

APPENDIX A

Profiles of Field Investigators

Project Team Profile

Michael D. Johnson, M.A.
Vertebrate Zoologist/Natural Resources
Davey Resource Group

Michael Johnson joined Davey in 1997. He specializes in fish, mammal, amphibian, and reptile studies. He is responsible for conducting ecological surveys, park inventories, and wetlands delineations. He is project manager for ecological surveys required for NEPA compliance and writes environmental documents. Mr. Johnson coordinates all endangered species studies at Davey and has extensive experience conducting habitat surveys and mist-netting studies for rare bats. Mr. Johnson has 10 years of experience in the environmental sciences. Prior to joining Davey, he served as a wildlife biologist for an environmental consulting firm; a zoologist for the Ohio Department of Natural Resources, assistant curator of vertebrate zoology with the Cleveland Museum of Natural History. He also has taught at the secondary and university levels.

Education

- M.A.T., Biology (Secondary Education, General Science), 1993 Kent State University, Kent, Ohio
- B.A., Biological Sciences (Vertebrate Zoology), 1991 Kent State University, Kent, Ohio

Certifications/Special Training

- Ohio Environmental Protection Agency: Certified stream ecologist for fish (IBI, MIwb) and habitat (QHEI) surveys and data analysis
- Bat Conservation International: Bat conservation and management training workshop
- United States Fish & Wildlife Service: Currently holds federal permit to conduct Indiana bat (*Myotis sodalis*) mist-netting studies

Professional Organizations

- Bat Conservation International - Research Associate
- Northern Ohio Association of Herpetologists
- Ohio Academy of Science
- Ohio Biological Survey
- American Fisheries Society

Project Team Profile

Dawn M. Nighman, M.S.
Environmental Hydrogeologist
Davey Resource Group

Ms. Nighman is a project manager for hydrogeological services provided by Davey Resource Group, and she manages projects including environmental site assessments, stormwater management and erosion control, water and soil sampling, and other hydrogeological projects. She has over six years of experience in the assessment and management of groundwater, surface water, and stormwater; conducting environmental site assessments; compliance with stormwater, hazardous waste, and community right-to-know regulations; and erosion and sediment control. Her experience has been obtained through environmental consulting, government grants, and academic research.

Ms. Nighman has modeled groundwater and surface water resources; developed stormwater pollution prevention plans; conducted Phase I and Phase II Environmental Site Assessments, and Phase III remediation activities; performed environmental compliance audits; prepared SARA reports; completed environmental permit applications; and sampled groundwater, stormwater and soils. In addition, Ms. Nighman has done extensive research on the design and performance characteristics of stormwater and sedimentation basins.

Education
- M.S., Geology, 1994, Kent State University, Kent, Ohio
- B.S., Physics, 1992, John Carroll University, Cleveland, Ohio

Certifications/Training
- Certified Professional in Erosion and Sediment Control (CPESC #1363)
- OSHA Hazardous Waste Site Operations 40-hour Training
- Stream Restoration using Bioengineering Techniques
- Stream Assessment and Field Measurement Techniques

Publications
- Infiltration Practices for Flood Control
- Trap Efficiency of a Stormwater Basin With and Without Baffles
- Sediment Basins: Using sediment basins, sediment traps and modified stormwater management basins to reduce pollution from construction sites in Ohio
- Pollutant Trap Efficiency of a Stormwater Retention Basin

Professional Affiliations/Community Involvement
- International Erosion Control Association
- Cuyahoga Valley Association
- Ohio Academy of Science
- Soil and Water Conservation Society
- Cleveland Engineering Society
- Northeast Ohio Chapter of Hazardous Materials Managers
- Earth Team Volunteer, Natural Resources Conservation Service

APPENDIX B

Work Plan

Golder Associates Inc.

305 Fellowship Road, Suite 200
Mt. Laurel, NJ USA 08054
Tel: (609) 273-1110
Fax (609) 273-0778

Golder Associates

June 23, 1999

Project No.: 933-6154

Mr. Anthony Rutter
USEPA Region 5
Waste Management Division
Office 4, Superfund
77 West Jackson Boulevard
Chicago, IL 60604

Mr. Joseph E. Trocchio
Ohio Environmental Protection Agency
Div. of Emergency and Remedial Response
Northeast District Office
2110 East Aurora Road
Twinsburg, OH 44087

RE: MFLBC SAMPLING PLAN, NEASE SITE, SALEM, OHIO

Gentlemen:

Golder Associates Inc. (Golder Associates), on behalf of RÜTGERS Organics Corporation (ROC), has prepared a sampling plan to be used for the upcoming sample collection proposed for the Middle Fork of Little Beaver Creek (MFLBC). Two copies of the plan have been attached for your review and approval.

ROC requests expeditious approval of the plan in order to meet the sampling schedule planned for the week of July 12, 1999. If you should have any questions regarding this plan, please do not hesitate to contact Golder Associates at 856-273-1110 or Mr. Ralph Pearce of ROC at 814-238-9287.

Very truly yours,

GOLDER ASSOCIATES INC.

Lori Anne Hendel
Senior Project Manager

LAH/bjb

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cc: Mike Johnson, Davey Resource Group (1 copy)
Rainer Domalski/Ralph Pearce, ROC (1 copy)

MFLBC FOCUSED ECOLOGICAL ASSESSMENT SAMPLING PLAN

Introduction

This document describes the work elements to be undertaken by RUTGERS Organics Corporation (ROC) as part of the MFLBC Focused Ecological Assessment. The remaining components of the work, specifically aquatic community sampling to evaluate Ohio Biocriteria Indices, will be undertaken by the Ohio Environmental Protection Agency (OEPA) Division of Surface Water. Fieldwork will be conducted jointly by ROC's consultants and OEPA, commencing July 12, 1999, to ensure the representativeness and comparability of the data collected by the two groups.

Sampling Locations

The following sampling locations have been selected by OEPA and USEPA:

River Mile	Description
40.3	"Background"
38.3	Immediately downstream of Salem Wastewater Treatment Plant (WWTP), downstream historical discharges on Buttermilk Creek
37.8	Immediately downstream of Salem WWTP, upstream of Nease
36.7	Upper low flow area of MFLBC, immediately downstream of Nease
33.3	Upper low flow area of MFLBC (Middletown Road/upstream crossing)
31.3	Higher flowing area before Egypt Swamp
28.8	Open straight reach through Egypt Swamp
27.1	Lower area of Egypt Swamp
25.1	Faster moving segment in ravine
20.9	Open wider flood plain near Franklin Square
15.1	Forested ravine
9.0	Downstream of (old) WWTP
4.6	Intermediate location between River Miles 9 and 1.9
1.9	Sediment deposition area

Joint field reconnaissance will be conducted by ROC and the OEPA to select the exact sampling locations to ensure that the data is representative and that appropriate descriptions of the sampling locations, habitats and potential anthropogenic influences are recorded.

Fish Tissue Sampling and Analysis

Fish tissue will be collected from each of the above sampling locations for analysis of mirex, photomirex, and kepone. Sampling will follow Ohio EPA's Fish Tissue Consumption Monitoring Program (FTCMP) protocol[1].

Sediment Chemistry Sampling and Analysis

Sediment samples will be collected from each of the above sampling locations using the Agency-approved methodology used in all prior MFLBC sediment sampling by ROC (ERM-Midwest, March 1990). The protocol specifies collecting samples from the stream bottom to a depth of 6 to 8 inches using a clean stainless steel trier (cylindrical tube for soil recovery). Samples will be homogenized in a clean stainless steel bowl and placed in a laboratory-supplied amber glass jar. Samples will be analyzed for the following constituents:

- TCL - VOCs
- TCL - SemiVOCs
- TCL - Pesticides
- TAL - Metals
- Mirex, Photomirex, and Kepone
- Grain Size Analysis
- Total Organic Carbon

Surface Water Sampling and Analysis

Surface water samples will be collected from each of the above sampling locations using the Agency-approved methodology used in all prior MFLBC sampling by ROC (ERM-Midwest, March 1990). Parameters measured in the field will include:

- Temperature
- Dissolved Oxygen
- pH
- Total dissolved solids

Surface water samples will also be collected for laboratory analysis of the following parameters:

- Biological Oxygen Demand (BOD)
- Total suspended solids
- Nutrients (nitrogen series and phosphorus)

[1] Ohio Environmental Protection Agency (1994) *Fish Tissue Monitoring Program Guidance Manual: MAS/1994-11-1*

Quality Assurance

All sampling will be conducted under strict Quality Assurance procedures in accordance with the Agency-approved methodology used in all prior MFLBC sampling by ROC (ERM-Midwest, March 1990). Procedures will include:

- Field decontamination of all sampling equipment between each sampling location;
- Collection of field duplicate samples at the rate of one duplicate per twenty primary samples;
- Analysis of field blank samples at the rate of one per twenty samples;
- Analysis of laboratory blank samples;
- Analysis of matrix spike/matrix spike duplicate samples at the rate of one per twenty samples;
- Frequent calibration of all instruments used to collect field parameter measurements;
- Independent data validation of 100 percent of samples.

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APPENDIX C

Recreational Fisheries - Raw Data

APPENDIX C: RECREATIONAL FISHERIES RAW DATA - MFLBC

RM 40.3 @ Georgetown Road 7-12-99			
Species	**Small, < 6"**	**Medium, 6"-8"**	**Large, > 8"**
Pumpkinseed Sunfish Class B		Total #: 1 Avg. Length: 7.3" Avg. Weight: .3 oz.	
White Sucker Class C	Total #: 19 Avg. Length: 4.4" Avg. Weight:	Total #: 2 Avg. Length: 7.4" Avg. Weight: 2.9 oz.	

RM 38.3 – Upstream Salem WWTP 7-12-99			
Species	**Small, < 6"**	**Medium, 6"-8"**	**Large, > 8"**
Bluegill Class B	Total #: 3 Avg. Length: 1.8" Avg. Weight: .18 oz.		
White Sucker Class C	Total #: 19 Avg. Length: 1.9" Avg. Weight: .07 oz.		
Yellow Bullhead Class C	Total #: 3 Avg. Length: 43" Avg. Weight: .9 oz.	Total #: 1 Avg. Length: 6.7" Avg. Weight: 2.8 oz.	

RM 37.8 @ Allen Road 7-12-99			
Species	**Small, < 6"**	**Medium, 6"-8"**	**Large, > 8"**
Largemouth Bass Class A	Total #: 1 Avg. Length: 3.7" Avg. Weight: .6 oz.		
Bluegill Class B	Total #: 9 Avg. Length: 2.7" Avg. Weight: .13 oz.		
Pumpkinseed Class B	Total #: 4 Avg. Length: 3.4" Avg. Weight: .56 oz.		
Green Sunfish Class B	Total #: 2 Avg. Length: 3.8" Avg. Weight: .88 oz.		
Yellow Bullhead Class C	Total #: 2 Avg. Length: 4.9" Avg. Weight: 1.34 oz.	Total #: 1 Avg. Length: 7.7" Avg. Weight: 4.2 oz.	
White Sucker Class C	Total #: 53 Avg. Length: 1.8" Avg. Weight: .07 oz.	Total #: 49 Avg. Length: 5.7" Avg. Weight: 1.3 oz.	Total #: 28 Avg. Length: 8.1" Avg. Weight: 4.0 oz.

RM 28.8 @ Ohio 165 7-13-99			
Species	**Small, < 6"**	**Medium, 6"-8"**	**Large, > 8"**
Largemouth Bass Class A	Total #: 1 Avg. Length: 5.9" Avg. Weight: 2.4 oz.		
Grass Pickeral Class A	Total #: 2 Avg. Length: 3.4" Avg. Weight: .14 oz.	Total #: 1 Avg. Length: 6.7" Avg. Weight: 1.2 oz.	
Bluegill Class B	Total #: 1 Avg. Length: 4.9" Avg. Weight: 1.8 oz.		
Pumpkinseed Class B	Total #: 2 Avg. Length: 3.7" Avg. Weight: .67 oz.		
Green Sunfish Class B	Total #: 8 Avg. Length: <6" Avg. Weight: 1.2 oz.		
Yellow Bullhead Class C			Total #: 1 Avg. Length: 9.1" Avg. Weight: 3.0 oz.
White Sucker Class C	Total #: 3 Avg. Length: < 6" Avg. Weight: .47 oz.	Total #: 1 Avg. Length: 6.6" Avg. Weight: 1.8 oz.	Total #: 7 Avg. Length: 9.4" Avg. Weight: 4.5 oz.
Common Carp Class C			Total #: 3 Avg. Length: 20.9" Avg. Weight: 69.4 oz. 4.3 lbs.

RM 25.8 @ Egypt Road/Ohio 14 junction 7-14-99			
Species	**Small, < 6"**	**Medium, 6"-8"**	**Large, > 8"**
Largemouth Bass Class A	Total #: 3 Avg. Length: < 6" Avg. Weight: .40 oz.		
Gross Pickeral Class A	Total #: 4 Avg. Length: < 6" Avg. Weight: .35 oz.		
Bluegill Class B	Total #: 3 Avg. Length: < 6" Avg. Weight: .81 oz.		
Pumpkinseed Class B	Total #: 1 Avg. Length: 5.5" Avg. Weight: 2.3 oz.		
Green Sunfish Class B	Total #: 3 Avg. Length: < 6" Avg. Weight: 1.8 oz.		

RM 25.8 @ Egypt Road/Ohio 14 junction 7-14-99 (Continued)			
Species	**Small, < 6"**	**Medium, 6"-8"**	**Large, > 8"**
Yellow Bullhead Class C		Total #: 1 Avg. Length: 6.6" Avg. Weight: 12.5 oz.	Total #: 1 Avg. Length: 9" Avg. Weight: 6.0 oz.
White Sucker Class C	Total #: 7 Avg. Length: < 6" Avg. Width: .08 oz.	Total #: 4 Avg. Length: 6-8" Avg. Weight: 1.4 oz.	Total #: 25 Avg. Length: 11.5' Avg. Weight: 6.2 oz.
Hog Sucker Class C	Total #: 1 Avg. Length: 4.1" Avg. Weight: 12.5 oz.	Total #: 1 Avg. Length: 7.2" Avg. Weight: 10.1 oz.	Total #: 1 Avg. Length: 11.9" Avg. Weight: 12.6 oz.
Common Carp Class C			Total #: 4 Avg. Length: 24.5" Avg. Weight: 137.3 oz. 8.6 lbs.

RM 23.5 @ Butcher Road 7-14-99			
Species	**Small, < 6"**	**Medium, 6"-8"**	**Large, > 8"**
Largemouth Bass Class A	Total #: 1 Avg. Length: 2.6" Avg. Weight: .11 oz.		
Grass Pickeral Class A			Total #: 1 Avg. Length: 8.1" Avg. Weight: 2.1 oz.
Black Crappie Class B	Total #: 1 Avg. Length: 5.7" Avg. Weight: 1.9 oz.		
Bluegill Class B	Total #: 8 Avg. Length: 4.4" Avg. Weight: 1.4 oz.		
Pumpkinseed Class B	Total #: 3 Avg. Length: 3.1" Avg. Weight: .35 oz.		
Yellow Bullhead Class C			Total #: 1 Avg. Length: 9.8" Avg. Weight: 9.5 oz.
White Sucker Class C	Total #: 1 Avg. Length: < 6" Avg. Weight: .7 oz.		Total #: 2 Avg. Length: 10.1" Avg. Weight: 6.4 oz.
Hog Sucker Class C	Total #: 2 Avg. Length: 4.9" Avg. Weight: .67 oz.	Total #: 1 Avg. Length: 7" Avg. Weight: 2.8 oz.	Total #: 9 Avg. Length: 10.3" Avg. Weight: 7.8 oz.
Common Carp Class C			Total #: 6 Avg. Length: 21.4" Avg. Weight: 94.6 oz. 5.9 lbs.

RM 21.8 @ Lisbon-Canfield Road 7-14-99			
Species	**Small, < 6"**	**Medium, 6"-8"**	**Large, > 8"**
Rock Bass Class A	Total #: 4 Avg. Length: 4.9" Avg. Weight: .1.7 oz.	Total #: 4 Avg. Length: 6.9" Avg. Weight: 4.4 oz.	Total #: 2 Avg. Length: 8.9" Avg. Weight: 8.7 oz.
Grass Pickeral Class A	Total #: 1 Avg. Length: Avg. Weight:		
Yellow Bullhead Class C		Total #: 3 Avg. Length: 6.6" Avg. Weight: 2.8 oz.	
White Sucker Class C	Total #: 2 Avg. Length: < 6" Avg. Weight: .04 oz.	Total #: 3 Avg. Length: 7.2" Avg. Weight: 2.5 oz.	Total #: 13 Avg. Length: 10.2" Avg. Weight: 6.6 oz.
Hog Sucker Class C	Total #: 4 Avg. Length: <6" Avg. Weight: .84 oz.	Total #: 1 Avg. Length: 6.6" Avg. Weight: 1.9 oz.	Total #: 7 Avg. Length: 9.4" Avg. Weight: 6.2 oz.

RM 20.9 @ Franklin Square 7-14-99			
Species	**Small, < 6"**	**Medium, 6"-8"**	**Large, > 8"**
Largemouth Bass Class A	Total #: 1 Avg. Length: 4.3" Avg. Weight: .67 oz.		Total #: 1 Avg. Length: 8.1" Avg. Weight: 5.3 oz.
Rock Bass Class A	Total #: 2 Avg. Length: 3.9" Avg. Weight: .88 oz.		
Black Crappie Class B			Total #: 1 Avg. Length: 8.9" Avg. Weight: 6.7 oz.
Bluegill Class B	Total #: 8 Avg. Length: 4.3" Avg. Weight:	Total #: 1 Avg. Length: 6.7" Avg. Weight: 4.4 oz.	
Brown Bullhead Class C		Total #: 1 Avg. Length: 7.9" Avg. Weight: 4.9 oz.	
Yellow Bullhead Class C	Total #: 1 Avg. Length: 3.7" Avg. Weight: .32 oz.		Total #: 1 Avg. Length: 9.3" Avg. Weight: 3.1 oz.
White Sucker Class C	Total #: 2 Avg. Length: 3.5" Avg. Weight: .38 oz.	Total #: 1 Avg. Length: 7.5" Avg. Weight: 2.8 oz.	Total #: 9 Avg. Length: 10.1" Avg. Weight: 6.4 oz.
Hog Sucker Class C	Total #: 4 Avg. Length: <6" Avg. Weight: 1.3 oz.		Total #: 2 Avg. Length: 9.8" Avg. Weight: 6.5 oz.

RM 15.0 @ Logtown/Kelch Road Intersection 7-15-99			
Species	**Small, < 6"**	**Medium, 6"-8"**	**Large, > 8"**
Rockbass Class A	Total #: 1 Avg. Length: 5.2" Avg. Weight: 2.1 oz.		
Largemouth Bass Class A	Total #: 1 Avg. Length: 1.6" Avg. Weight: .04 oz.		
White Sucker Class C	Total #: 13 Avg. Length: <6" Avg. Weight: .16 oz.	Total #: 8 Avg. Length: 6"-8" Avg. Weight: 1.6 oz.	Total #: 7 Avg. Length: 9.6" Avg. Weight: 5.6 oz.
Hog Sucker Class C	Total #: 2 Avg. Length: <6" Avg. Weight: .53 oz.	Total #: 7 Avg. Length: 6.9" Avg. Weight: 2.6 oz.	Total #: 17 Avg. Length: 9.7" Avg. Weight: 7.0 oz.

RM 4.5 @ Lusk Lock Road 7-15-99			
Species	**Small, < 6"**	**Medium, 6"-8"**	**Large, > 8"**
Smallmouth Bass Class A	Total #: 1 Avg. Length: <6" Avg. Weight: .14 oz.	Total #: 3 Avg. Length: 7.0" Avg. Weight: 2.4 oz.	Total #: 5 Avg. Length: 13.6" Avg. Weight: 19.4 oz. 1.2 lbs.
Rock Bass Class A		Total #: 1 Avg. Length: 6.4" Avg. Weight: 3.2 oz.	
Bluegill Class B	Total #: 2 Avg. Length: <6" Avg. Weight: .37 oz.		
Green Sunfish Class B	Total #: 1 Avg. Length: <6" Avg. Weight: .11 oz.		
Drum Class C			Total #: 8 Avg. Length: 14.6" Avg. Weight: 21.2 oz. 1.3 lbs.
White Sucker Class C		Total #: 1 Avg. Length: 7.3" Avg. Weight: 2.4 oz.	Total #: 2 Avg. Length: 14.0" Avg. Weight: 16.1 oz. 1.0 lbs.
Black Redhorse Sucker Class C			Total #: 3 Avg. Length: 14.6" Avg. Weight: 17.2 oz. 1.1 lb.
Golden Redhorse Sucker Class C			Total #: 1 Avg. Length: 13.1" Avg. Weight: 14 oz.

Species	Small, < 6"	Medium, 6"-8"	Large, > 8"
Silver Redhorse Sucker Class C			Total #: 1 Avg. Length: 19.7" Avg. Weight: 49.4 oz. 3.1 lbs.
Hog Sucker Class C	Total #: 1 Avg. Length: <6" Avg. Weight: .89 oz.	Total #: 2 Avg. Length: 5.7" Avg. Weight: 1.2 oz.	Total #: 7 Avg. Length: 11.0" Avg. Weight: 8.0 oz.
Common Carp Class C			Total #: 8 Avg. Length: 18.6" Avg. Weight: 50.6 oz. 3.2 lbs.

RM 1.9 @ Bear Hollow Road 7-15-99			
Species	**Small, < 6"**	**Medium, 6"-8"**	**Large, > 8"**
Smallmouth Bass Class A			Total #: 1 Avg. Length: 11.5" Avg. Weight: 11.7 oz.
Sauger Class A			Total #: 1 Avg. Length: 15" Avg. Weight: 11.8 oz.
Rockbass Class A		Total #: 1 Avg. Length: 5.4" Avg. Weight: 1.8 oz.	
Channel Catfish Class B			Total #: 1 Avg. Length: 17.3" Avg. Weight: 32.1 oz. 2.0 lbs.
Bluegill Class B	Total #: 2 Avg. Length: 3.3" Avg. Weight: .39 oz.	Total #: 1 Avg. Length: 5.9" Avg. Weight: 2.7 oz.	
Green Sunfish Class B	Total #: 2 Avg. Length: 2.6" Avg. Weight: .28 oz.		
Common Carp Class C			Total #: 4 Avg. Length: 21" Avg. Weight: 4.6 lbs.
Freshwater Drum Class C			Total #: 2 Avg. Length: 14" Avg. Weight: 18.6 oz.
Black Redhorse Sucker Class C			Total #: 15 Avg. Length: 14.5" Avg. Weight: 17.3 oz.

Species	Small, < 6"	Medium, 6"-8"	Large, > 8"
Silver Redhorse Sucker Class C			Total #: 1 Avg. Length: 16.9" Avg. Weight: 30.3 oz.
Hog Sucker Class C	Total #: 2 Avg. Length: 1.9" Avg. Weight: .07 oz.		Total #: 16 Avg. Length: 11.7" Avg. Weight: 11.0 oz.
Golden Redhorse Sucker Class C			Total #: 3 Avg. Length: 13.6" Avg. Weight: 15.9 oz.
Yellow Bullhead Class C			Total #: 2 Avg. Length: 9.3" Avg. Weight: 6.8 oz.
White Sucker Class C	Total #: 1 Avg. Length: 2.0" Avg. Weight: .04 oz.		

APPENDIX D

List of Pollution Dischargers - MFLBC

FACILITIES IN COLUMBIANA & MAHONING COUNTIES

STNO	NPID	FNMS	CNTY	RWAT
3IF00042	OH0107000	BEAZER EAST, INC.	MAHONING	
3IV00201	OH0012718	WELLSVILLE, CITY OF	COLUMBIANA	-?
3PG00034	OH0123366	SHERWOOD FOREST	MAHONING	ANDERSON RUN
3IS00014	OH0071843	YSD INDUSTRIES INC	MAHONING	BEARS DEN RUN
3IN00225	OH0112321	VALLEY VIEW GAS STATION	MAHONING	BEARS DEN RUN
3IN00135	OH0092100	METAL CARBIDES CORP	MAHONING	BOARDMAN DITCH
3PB00059	OH0026735	NEW WATERFORD, VILLAGE OF	COLUMBIANA	BULL CREEK
3IP00070	OH0093939	BUCKEYE INDUSTRIAL MINE INC	COLUMBIANA	BULL CREEK
3IN00115	OH0089915	FIRESTONE TIRE & RUBBER CO	COLUMBIANA	BULL CREEK & PIN
3IP00029	OH0089567	EAST FAIRFIELD COAL CO	COLUMBIANA	BULL CREEK & TUR
3IS00050	OH0071983	COLUMBIA COUNTY PORT AUTHOR	COLUMBIANA	CHERRY VALLEY RU
3PB00051	OH0028011	WASHINGTONVILLE, VILLAGE OF	COLUMBIANA	CHERRY VALLEY RU
3IP83442	OH0086690	GETZ COAL SALES, INC.	COLUMBIANA	COLD RUN
3IF00011	OH0011711	KOPPERS COMPANY INC	MAHONING	CRAB CREEK
3IS00052	OH0083640	POLLACK COMPANY	MAHONING	CRAB CRK TO MAHO
3II00006	OH0090174	SUN PIPE LINE CO	MAHONING	DRAINAGE DITCH T
3PS00012	OH0117587	PONDEROSA PARK RESORT	MAHONING	DUNN EDEN LAKE T
3IE00035	OH0011452	NATIONAL REFRACTORIES & MIN	COLUMBIANA	EAST BRANCH-LITT
3PB00017	OH0021652	LEETONIA, VILLAGE OF	COLUMBIANA	EAST BRANCH-LITT
3PP00036	OH0098079	OHIO TURNPIKE COMM	MAHONING	EVANS LAKE
3IN00045	OH0083658	CENTRAL WASTES LANDFILL	MAHONING	FISH CREEK
3PH00016	OH0037273	MAHONING CO COMMISSIONERS	MAHONING	HARMAN RUN
3PC00002	OH0021784	EAST PALESTINE, CITY OF	COLUMBIANA	LESLIE RUN
3IP00102	OH0098701	EAST FAIRFIELD COAL CO.	COLUMBIANA	LISBON CREEK
3PC00025	OH0021067	LISBON, VILLAGE OF	COLUMBIANA	LITTLE BEAVER CK
3IQ00001	OH0022411	WORTHINGTON CUSTOM PLASTICS	COLUMBIANA	LITTLE BEAVER CK
3PD00027	OH0027324	SALEM, CITY OF	COLUMBIANA	LITTLE BEAVER CK
3ID00051	OH0035718	CRANE COMPANY	COLUMBIANA	LITTLE BEAVER CK
3IS00074	OH0038105	LISBON STEEL FABRICATING	COLUMBIANA	LITTLE BEAVER CK
3IE00054	OH0038423	GORDON BROTHERS INC.	COLUMBIANA	LITTLE BEAVER CK
3PV00018	OH0044849	CENTURY TRAILER MANUFACT IN	COLUMBIANA	LITTLE BEAVER CK
3PV00022	OH0046938	CURT MOSHER	COLUMBIANA	LITTLE BEAVER CK
3IN00017	OH0051799	LTPI	COLUMBIANA	LITTLE BEAVER CK
3PH00043	OH0063681	COLUMBIANA CO.-GUILFORD LAKES	COLUMBIANA	LITTLE BEAVER CK
3IP00036	OH0090247	KELLY COAL CO	COLUMBIANA	LITTLE BEAVER CR
3IP00037	OH0090255	KELLY COAL CO	COLUMBIANA	LITTLE BEAVER CR
3IP00052	OH0093335	FERRIS COAL CO	COLUMBIANA	LITTLE BEAVER CR
3IP00062	OH0093564	LISBON COAL CRUSHERS INC	COLUMBIANA	LITTLE BEAVER CR
3IP00080	OH0094702	COMMERCIAL MINERALS INC	COLUMBIANA	LITTLE BEAVER CR
3IP00084	OH0095729	M & S COAL CO	COLUMBIANA	LITTLE BEAVER CR
3IP00120	OH0100188	BLUM COAL COMPANY	COLUMBIANA	LITTLE BEAVER CR
3IP00124	OH0100498	BLUM COAL COMPANY	COLUMBIANA	LITTLE BEAVER CR
3IP00056	OH0093441	KELLY COAL CO	COLUMBIANA	LITTLE BULL CREE
3PX00013	OH0024724	SKYVIEW ACRES	COLUMBIANA	LITTLE YELLOW CR
3IT00004	OH0010791	CSX TRANSPORTATION INC.	MAHONING	MAHONING RIVER
3ID00006	OH0011282	LTV STEEL COMPANY, INC.	MAHONING	MAHONING RIVER
3ID00037	OH0011312	LTV STEEL COMPANY, INC.	MAHONING	MAHONING RIVER
3ID00036	OH0011321	LTV STEEL COMPANY	MAHONING	MAHONING RIVER
3PC00011	OH0020443	SEBRING, CITY OF	MAHONING	MAHONING RIVER

CK = Middle Fork

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Phone # | Phone # 644-2031
Fax # (330) 673-5408 | Fax #

FACILITIES IN COLUMBIANA & MAHONING COUNTIES

QL **********

STNO	NPID	FNMS	CNTN	RWAT
3PC00000	OH0021776	COLUMBIANA VILLAGE	COLUMBIANA	MAHONING RIVER
3PN00000	OH0023671	U.S. CORP OF ENGINEERS	MAHONING	MAHONING RIVER
3PB00005	OH0024091	BELOIT, VILLAGE OF	MAHONING	MAHONING RIVER
3PD00008	OH0024325	CAMPBELL, CITY OF	MAHONING	MAHONING RIVER
3PC00007	OH0026204	LOWELLVILLE, VILLAGE OF	MAHONING	MAHONING RIVER
3PD00026	OH0027600	STRUTHERS, CITY OF	MAHONING	MAHONING RIVER
3PE00006	OH0028223	YOUNGSTOWN, CITY OF	MAHONING	MAHONING RIVER
3PM00030	OH0043851	MAHONING COUNTY COMMISSIONE	MAHONING	MAHONING RIVER
3IN00071	OH0084093	GREENSTEEL INC	MAHONING	MAHONING RIVER
3IP00024	OH0088706	KEFFLER & ROSE ENTERPRISES	COLUMBIANA	MAHONING RIVER
3IP00081	OH0094153	C & E COAL CO	COLUMBIANA	MC CORMICK RUN
3PK00011	OH0045721	MAHONING CO. BD. OF COMM.	MAHONING	MEANDER CREEK
3IP00020	OH0087785	LISBON COAL CRUSHERS INC	COLUMBIANA	MIDDLE FORK LITT
3IP00057	OH0093459	INDUSTRIAL MINING CO	COLUMBIANA	MIDDLE FORK LITT
3IP00059	OH0093475	INDUSTRIAL MINING CO	COLUMBIANA	MIDDLE FORK LITT
3IP00111	OH0099937	M & S COAL CO	COLUMBIANA	MIDDLE FORK LITT
3IP00012	OH0087670	EAST FAIRFIELD COAL CO	COLUMBIANA	MIDDLE FORK OF L
3IP00044	OH0090557	EAST FAIRFIELD COAL CO	COLUMBIANA	MIDDLE FORK OF L
3IN00138	OH0092231	FERRIS COAL CO INC	COLUMBIANA	MIDDLE FORK OF L
3IP00065	OH0093726	CARDINAL MINING INC	COLUMBIANA	MIDDLE FORK OF L
	OH0122084	ELKTON WWTP	COLUMBIANA	MIDDLE FORK OF L
3IP00129	OH0100862	CENTER MINING COMPANY	COLUMBIANA	MIDDLE FORK TO B
3PK00002	OH0037249	MAHONING COUNTY - BOARDMAN	MAHONING	MILL CREEK
3IC00074	OH0064238	YOUNGSTOWN HARDCHROME, INC.	MAHONING	MILL CREEK
3IG00041	OH0088129	MARATHON OIL CO. YOUNGSTOWN	MAHONING	MILL CREEK
3IV00250	OH0083682	LISBON BOARD OF PUBLIC AFF.	COLUMBIANA	MILL SITE CREEK
3ID00008	OH0006891	WARREN CONSOLIDATED INDUSTR	MAHONING	MUSKINGUM RIVER
3IL00014	OH0083895	FERRIS COAL CO	COLUMBIANA	N FORK OF LITTLE
3IL00004	OH0091910	THOMPSON BROS MINING CO	MAHONING	N FORK OF LITTLE
3IP00035	OH0090239	BLUM COAL CO	COLUMBIANA	NORTH FORK - LIT
3IP00008	OH0087343	STAR K MINING	COLUMBIANA	NORTH FORK OF YE
3PB00026	OH0063746	SALINEVILLE, VILLAGE OF	COLUMBIANA	NORTH FORK YELLO
3IJ00015	OH0011410	THE HALL CHINA COMPANY	COLUMBIANA	OHIO RIVER
3IE00040	OH0012327	THE STERLING CHINA CO.	COLUMBIANA	OHIO RIVER
3PD00009	OH0024970	EAST LIVERPOOL, CITY OF	COLUMBIANA	OHIO RIVER
3PD00023	OH0028045	WELLSVILLE, CITY OF	COLUMBIANA	OHIO RIVER
3IG00007	OH0029068	ASHLAND OIL INC	COLUMBIANA	OHIO RIVER
3IG00037	OH0064157	WELLSVILLE STORAGE AND TRAN	COLUMBIANA	OHIO RIVER
3IN00297	OH0123617	BP OIL CO	COLUMBIANA	OHIO RIVER
3IL00013	OH0083887	C&W MINING COMPANY, INC	COLUMBIANA	PATTERSON CREEK
3IP00123	OH0100480	FERRIS COAL COMPANY, INC.	COLUMBIANA	PATTERSON RUN
3IP00144	OH0106615	C & E COAL INCORPORATED	COLUMBIANA	PATTERSON TO W F
3IS00020	OH0012165	LAKE PARK TOOL MACHINE	MAHONING	PINE HOLLOW CREE
3PR00110	OH0091707	PONDEROSA PARK RESORTS INC	MAHONING	PONDEROSA LAKE
3IP00068	OH0093831	HANOVER COAL INC	COLUMBIANA	SANDY CREEK
3IP00069	OH0093921	BUCKEYE INDUSTRIAL MINE INC	COLUMBIANA	SANDY CREEK
3IP00076	OH0094048	JOHN GLENN MINING COMPANY	COLUMBIANA	SANDY CREEK
3IP00118	OH0100153	COALBROOK MINING, INC.	COLUMBIANA	SANDY CREEK
3II00180	OH0122076	TRI STATE MATERIAL PROCESS	COLUMBIANA	SANDY CREEK

APPENDIX E

References

REFERENCES

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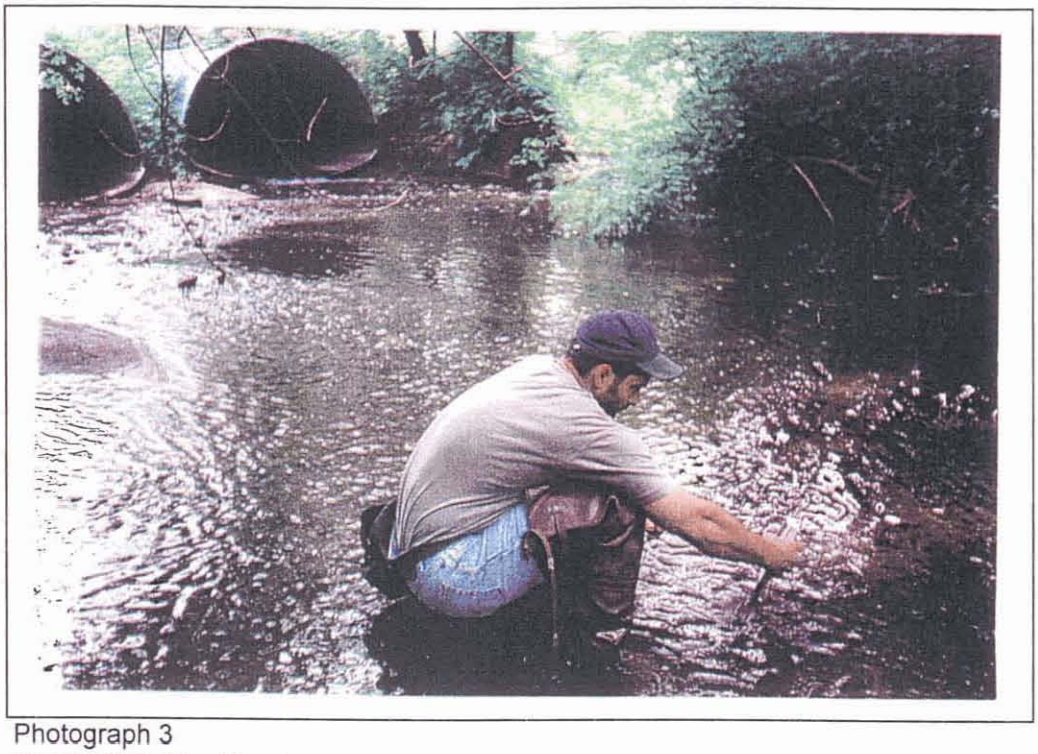
APPENDIX F

Photographs

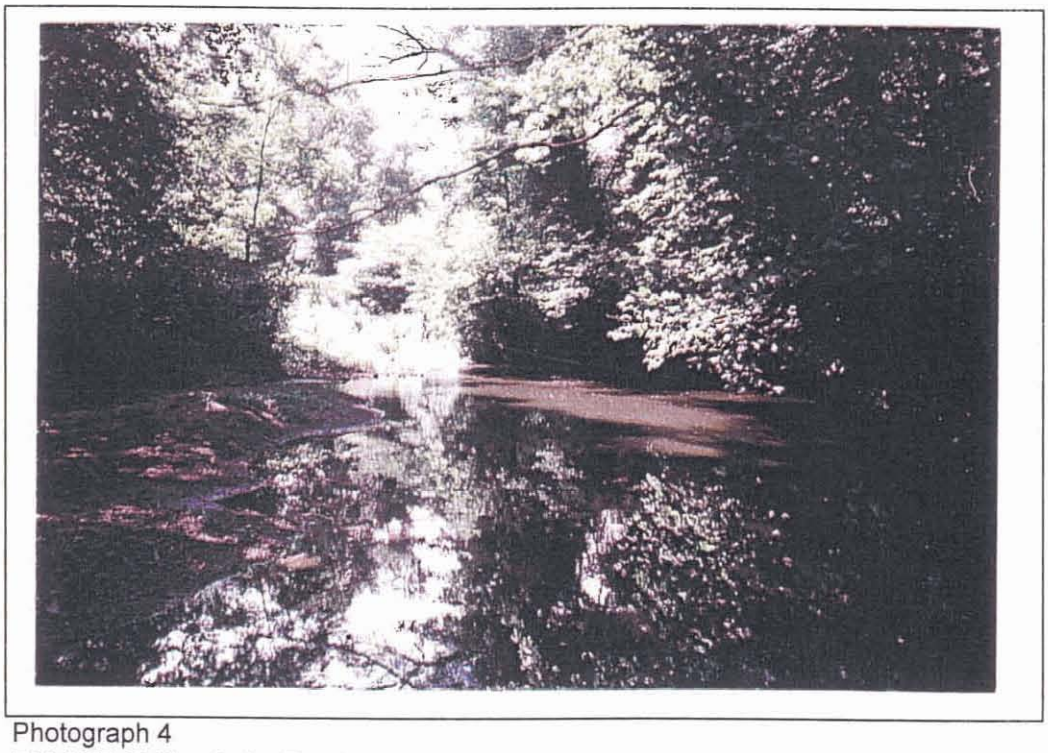
APPENDIX F: PHOTOGRAPHS OF SITE

Photograph 1
RM 40.3 @ Georgetown Road

Photograph 2
RM 38.3 @ Salem Industrial Park



Photograph 3
RM 37.7 @ Allen Road

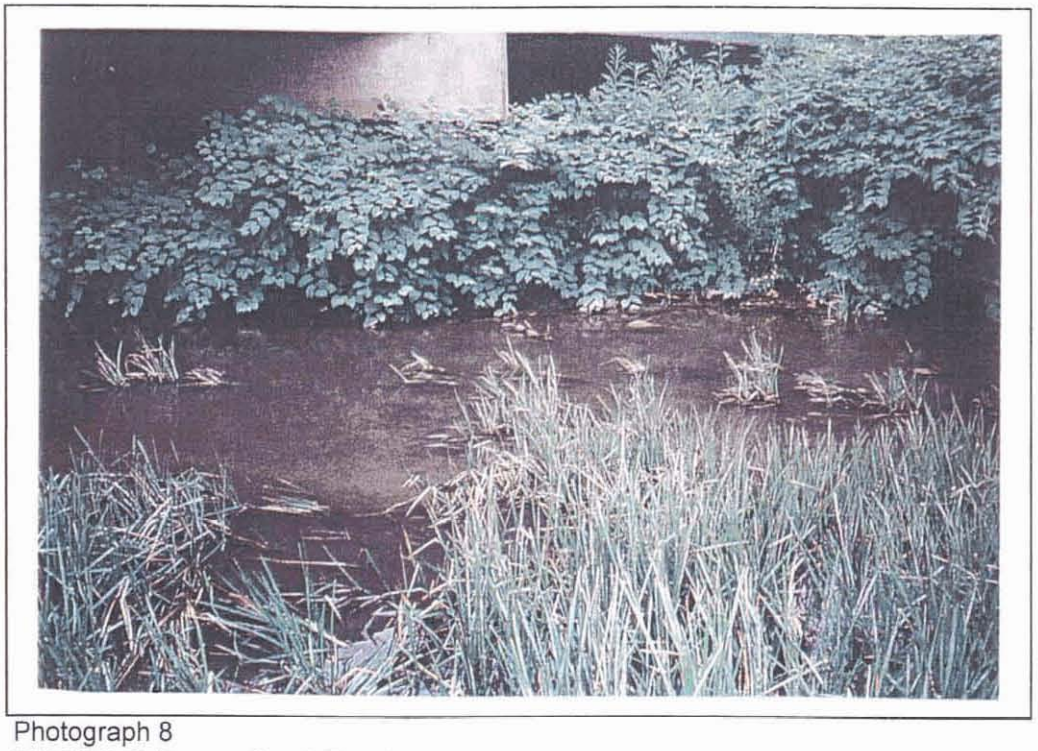


Photograph 4
RM 36.7 @ Pine Lake Road

Photograph 5
RM 33.3 @ Middletown Road

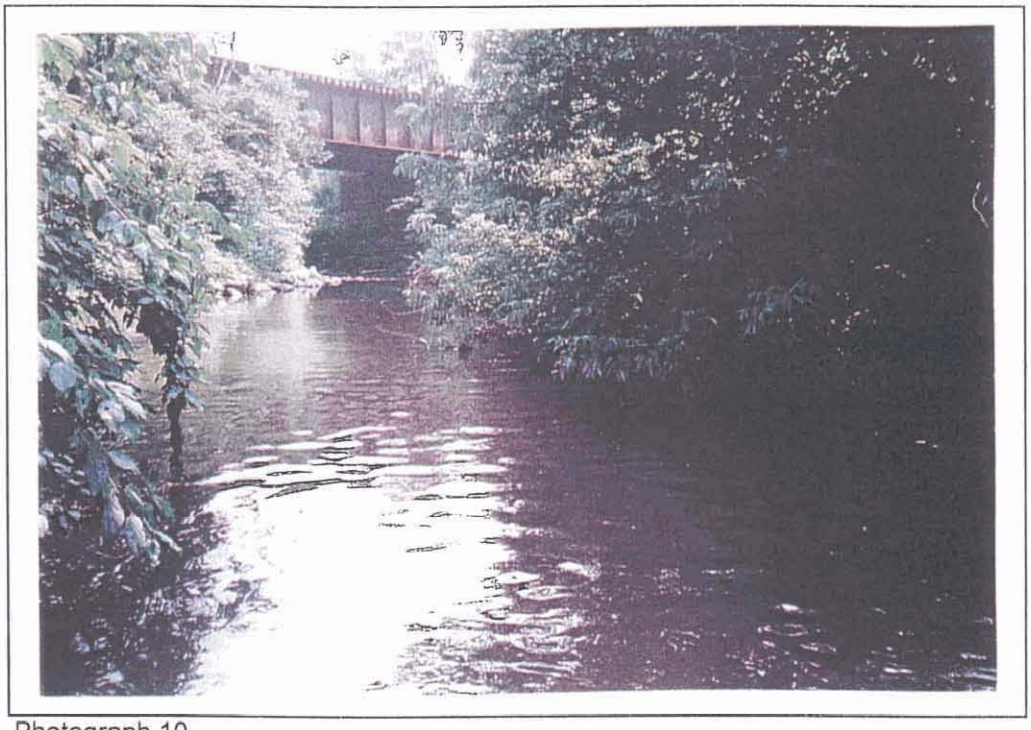
Photograph 6
RM 32.0 @ Ohio 45

Photograph 7
RM 28.8 @ Ohio 165

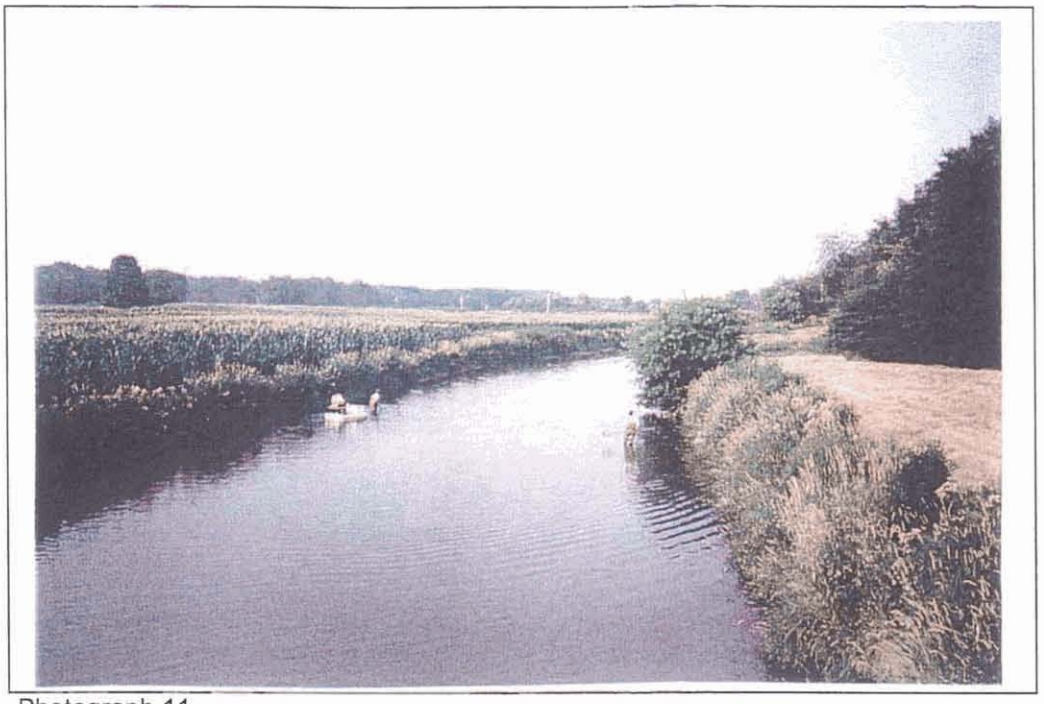


Photograph 8
RM 25.8 @ Beaver Creek Road

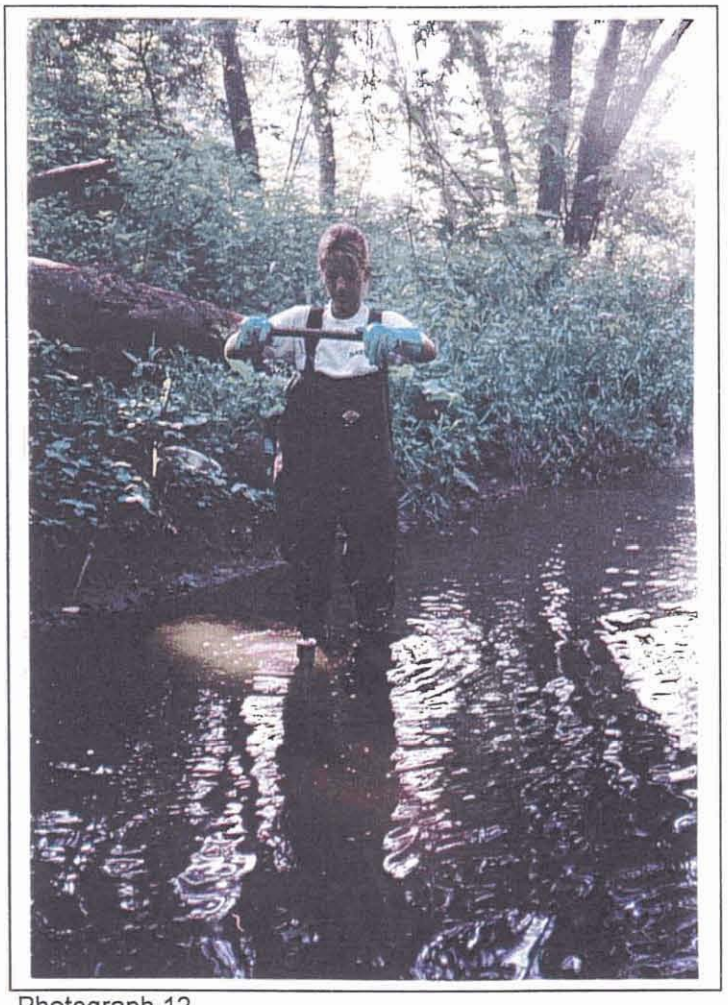
Photograph 9
RM 23.5 @ Butcher Road



Photograph 10
RM 21.8 @ Lisbon-Canfield Road



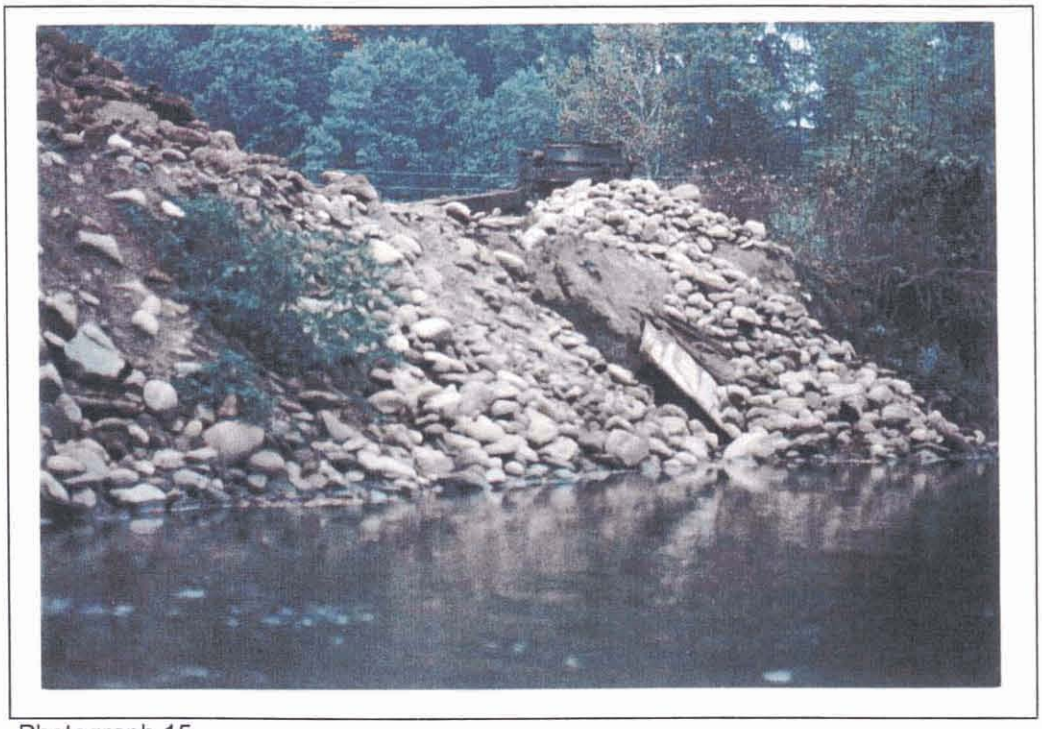
Photograph 11
RM 20.9 @ Ohio 558



Photograph 12
RM 15.0 Kelch Road

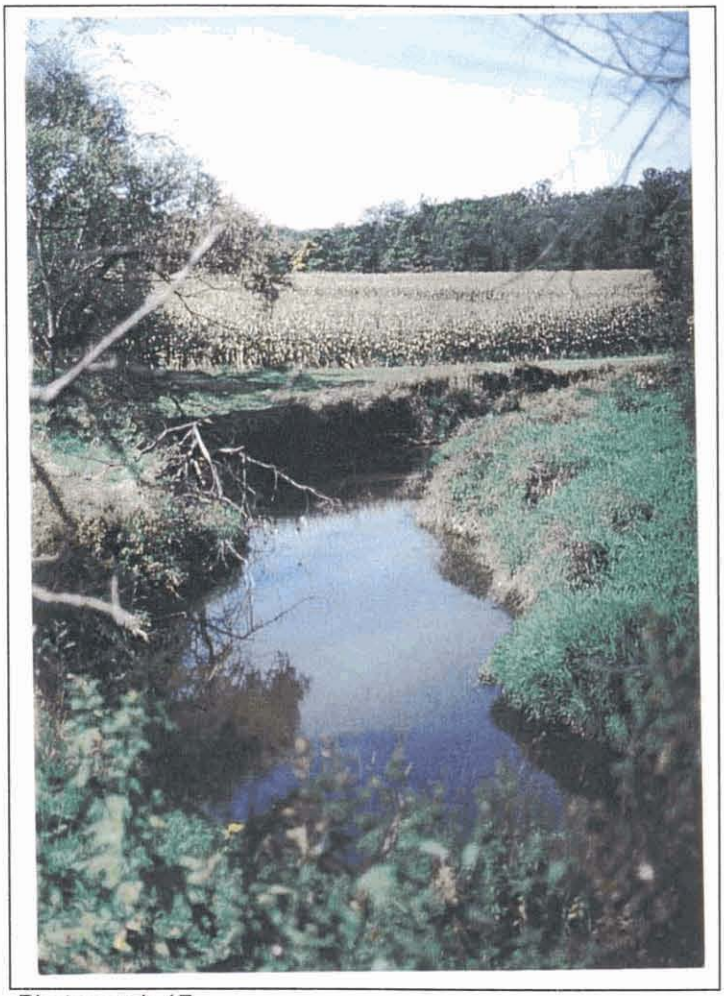
Photograph 13
RM 4.4 @ Lusk Lock Road

Photograph 14
RM 1.9 @ Bear Hollow Road

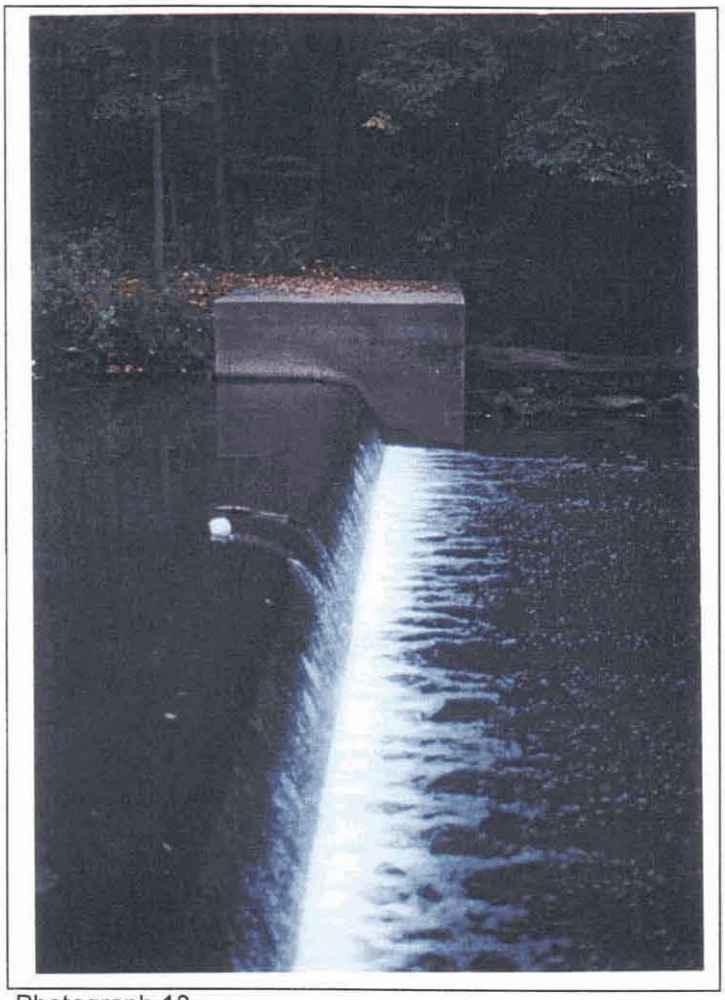


Photograph 15
Sand and gravel mining along the banks of the Middle Fork is a likely source of downstream sedimentation. This operation is located in the City of Lisbon.

Photograph 16
Construction of this access road at the Salem Industrial Park has resulted in channel modification and increased erosion.



Photograph 17
In some areas, intensive agriculture encroaches upon the riparian zone and can lead to increased erosion and sediment deposition.



Photograph 18
Barriers such as the Lisbon Dam restrict the free movement of fish and can impact migratory species such as smallmouth bass.

APPENDIX C

OEPA Biocriteria Data Sheets

Macroinvertebrate Data Sheets (ICI)

Middle Fork Little Beaver Creek, 1999

River Mile	Drainage Area (sq mi)	Number of: Total Taxa	Mayfly Taxa	Caddisfly Taxa	Dipteran Taxa	Percent: Mayflies	Caddis-flies	Tany-tarsini	Other Dipt/NI	Tolerant Organisms	Qual. EPT	Eco-region	ICI
Middle Fork Little Beaver Creek (08-200)													
Year: 1999													
40.30	1.7	25(4)	2(0)	0(0)	10(2)	1.1(2)	0.0(0)	0.0(0)	97.8(0)	81.7(0)	5(2)	3	10
37.70	6.1	35(4)	2(0)	4(6)	20(6)	0.1(2)	8.0(6)	3.5(2)	88.0(0)	37.9(0)	5(2)	3	28
36.70	8.3	35(4)	1(0)	4(6)	16(4)	0.2(2)	49.3(6)	3.1(2)	42.4(4)	15.1(4)	3(0)	3	32
33.30	17.9	28(4)	1(0)	4(6)	16(4)	12.8(4)	60.4(6)	3.5(2)	21.8(6)	1.1(6)	5(2)	3	40
32.00	18.9	33(4)	3(2)	3(6)	15(4)	4.0(2)	11.6(6)	46.6(6)	33.7(4)	8.9(4)	6(2)	3	40
28.80	26.0	34(4)	2(0)	3(6)	18(4)	3.1(2)	5.9(4)	50.7(6)	22.5(6)	4.8(6)	4(2)	3	40
25.80	32.0	30(4)	3(2)	2(4)	19(4)	1.4(2)	14.3(6)	20.8(4)	61.0(2)	16.0(2)	4(0)	3	30
23.50	36.0	34(4)	1(0)	5(6)	20(6)	4.6(2)	10.3(6)	33.7(6)	51.3(2)	2.9(6)	4(0)	3	38
21.80	41.0	39(6)	2(0)	5(6)	22(6)	6.5(2)	60.2(6)	16.3(4)	14.6(6)	2.3(6)	6(2)	3	44
20.90	73.0	46(6)	4(2)	3(4)	24(6)	3.4(2)	2.0(2)	12.2(2)	70.8(0)	16.8(2)	4(0)	3	26
15.00	96.0	26(4)	4(2)	4(6)	12(2)	27.7(4)	28.3(6)	35.4(6)	7.4(6)	1.5(6)	6(2)	3	44
10.70	112.0	36(4)	8(4)	3(4)	14(4)	3.3(2)	24.2(6)	26.6(4)	44.8(2)	7.0(4)	9(2)	3	36
10.00	112.0	36(4)	7(4)	5(6)	14(4)	4.0(2)	35.8(6)	23.8(4)	35.6(4)	8.4(4)	10(4)	4	42
9.00	114.0	29(4)	5(2)	5(6)	11(2)	3.9(2)	23.9(6)	39.8(6)	31.6(4)	1.6(6)	8(2)	4	40
8.40	125.0	41(6)	7(4)	6(6)	17(4)	4.6(2)	21.5(6)	46.8(6)	25.9(6)	3.4(6)	12(4)	4	50
4.40	138.0	36(4)	9(6)	4(4)	16(4)	28.1(4)	7.2(2)	30.7(4)	32.6(4)	6.8(4)	11(4)	4	40
1.90	141.0	33(4)	6(4)	5(6)	13(4)	21.2(4)	2.5(2)	48.4(6)	27.0(6)	6.6(4)	9(2)	4	42

Fish Biocriteria Data Sheets (Modified I_{wb} & IBI)

Middle Fork Little Beaver Creek, 1999

River Mile	Type	Date	Drainage area (sq mi)	Number of: Total species	Minnow species	Headwater species	Sensitive species	Darter & Sculpin species	Simple Lithophils	Percent of Individuals: Tolerant fishes	Omni-vores	Pioneering fishes	Insect-ivores	DELT anomalies	Rel.No. minus tolerants /(0.3km)	IBI
M. Fk. L. Beaver Cr. - (08-200)																
Year: 1999																
40.30	E	07/12/1999	1.7	10(5)	4(3)	2(3)	0(1)	1(3)	2(3)	91(1)	28(1)	47(3)	9(1)	0.0(5)	86(3)	32
40.30	E	08/23/1999	1.7	8(5)	4(3)	2(3)	0(1)	1(3)	2(3)	95(1)	47(1)	62(1)	5(1)	0.0(5)	104(3)	30
38.20	E	07/12/1999	4.2	12(5)	6(5)	2(3)	0(1)	1(1)	2(1)	39(3)	10(5)	32(3)	2(1)	0.3(3)	896(5)	36
38.20	E	08/24/1999	4.2	14(5)	6(5)	2(3)	0(1)	2(3)	2(1)	83(1)	38(1)	37(3)	4(1)	0.0(5)	428(5)	34
37.70	D	07/12/1999	6.1	13(5)	5(3)	2(3)	0(1)	2(3)	2(1)	77(1)	52(1)	32(3)	8(1)	0.3(5)	119(1)	28
37.70	D	08/23/1999	6.1	11(3)	6(5)	2(3)	0(1)	2(3)	2(1)	72(1)	46(1)	37(3)	17(1)	0.5(3)	182(3)	28
36.70	D	07/13/1999	8.3	12(3)	6(3)	3(3)	0(1)	3(3)	3(3)	65(1)	43(1)	33(3)	7(1)	0.0(5)	206(3)	30
36.70	D	08/23/1999	8.3	12(3)	7(5)	2(3)	0(1)	2(3)	3(3)	69(1)	32(1)	45(3)	5(1)	0.2(5)	266(3)	32
33.30	D	07/13/1999	17.9	14(3)	6(3)	2(3)	3(1)	4(3)	6(3)	35(3)	14(5)	27(5)	21(1)	0.9(3)	455(3)	36
33.30	D	08/24/1999	17.9	15(3)	6(3)	2(3)	3(1)	4(3)	6(3)	42(3)	16(5)	29(5)	16(1)	0.6(3)	684(3)	36
32.00	D	08/24/1999	18.9	14(3)	7(5)	2(3)	2(1)	3(3)	5(3)	43(3)	19(3)	29(5)	10(1)	0.2(3)	720(3)	36
32.00	D	07/13/1999	18.9	13(3)	6(3)	2(3)	2(1)	3(3)	5(3)	32(3)	12(5)	19(5)	8(1)	0.2(3)	651(3)	36

▲ - IBI is low end adjusted.

* - < 200 Total individuals in sample

** - < 50 Total individuals in sample

● - One or more species excluded from IBI calculation.

River Mile	Type	Date	Drainage area (sq mi)	Number of: Total species	Sunfish species	Sucker species	Intolerant species	Darter species	Percent of Individuals: Simple Lithophils	Tolerant fishes	Omni-vores	Top carnivores	Insect-ivores	DELT anomalies	Rel.No. minus tolerants /(0.3km)		IBI	Modified Iwb
M. Fk. L. Beaver Cr. - (08200)																		
Year: 1999																		
28.80	D	08/24/1999	26	19(5)	4(5)	2(3)	0(1)	2(3)	51(5)	75(1)	53(1)	5.6(5)	36(3)	9.0(1)	87(1)		34	5.8
25.80	D	08/24/1999	32	17(3)	4(5)	2(3)	0(1)	3(3)	52(5)	62(1)	55(1)	12.8(5)	29(3)	13.4(1)	86(1)		32	5.9
25.80	D	07/14/1999	32	13(3)	3(3)	2(3)	0(1)	2(1)	53(5)	66(1)	60(1)	5.0(3)	32(3)	5.4(1)	37(1)	*	26	5.1
23.50	D	08/25/1999	36	17(3)	3(3)	2(3)	0(1)	4(3)	47(5)	42(3)	22(3)	3.6(3)	45(3)	0.0(5)	173(1)		36	7.6
23.50	D	07/14/1999	36	17(3)	3(3)	2(3)	0(1)	3(3)	28(3)	16(5)	12(5)	1.3(3)	40(3)	0.0(5)	192(1)		38	6.3
21.80	D	08/25/1999	41	18(3)	2(3)	2(3)	0(1)	4(3)	38(5)	45(3)	36(1)	7.2(5)	36(3)	0.0(5)	252(3)		38	8.1
21.80	D	07/14/1999	41	15(3)	1(1)	2(3)	0(1)	4(3)	39(5)	33(3)	27(3)	6.8(5)	55(5)	1.2(3)	179(1)		36	7.4
20.90	D	08/25/1999	73	14(3)	6(5)	2(3)	0(1)	1(1)	22(3)	22(5)	14(5)	28.7(5)	57(5)	1.6(1)	121(1)	*	38	7.6
15.00	D	08/25/1999	96	14(3)	1(1)	2(3)	0(1)	4(3)	28(3)	18(5)	12(5)	1.2(3)	54(3)	0.3(3)	741(3)		36	8.1
15.00	D	07/15/1999	96	13(3)	1(1)	2(3)	0(1)	4(3)	32(3)	13(5)	10(5)	0.6(1)	79(5)	0.0(5)	467(3)		38	7.3
4.40	D	08/26/1999	138	26(5)	3(3)	4(3)	6(5)	4(3)	57(5)	9(5)	13(5)	4.1(3)	80(5)	0.3(3)	458(3)		48	9.4
4.40	D	07/15/1999	138	20(3)	3(3)	5(5)	3(3)	4(3)	54(5)	19(5)	21(3)	9.8(5)	62(5)	2.9(1)	113(1)	*	42	8.3
1.90	D	08/26/1999	141	28(5)	3(3)	6(5)	5(3)	3(3)	71(5)	10(5)	9(5)	5.3(5)	83(5)	1.1(3)	359(3)		50	9.5
1.90	D	07/15/1999	141	27(5)	3(3)	5(5)	6(5)	3(3)	69(5)	9(5)	14(5)	1.6(3)	81(5)	0.5(3)	251(3)		50	9.1

na - Qualitative data, Modified Iwb not applicable.

▲ - IBI is low end adjusted.

* - < 200 Total individuals in sample

** - < 50 Total individuals in sample

● - One or more species excluded from IBI calculation.

River Mile	Type	Date	Drainage area (sq mi)	Number of: Total species	Sunfish species	Sucker species	Intolerant species	Darter species	Percent of Individuals: Simple Lithophils	Tolerant fishes	Omni-vores	Top carnivores	Insect-ivores	DELT anomalies	Rel.No. minus tolerants /(0.3km)	IBI	Modified Iwb
M. Fk. L. Beaver Cr. - (08200)																	
Year: 1999																	
10.90	D	08/05/1999	105	28(5)	3(3)	5(5)	4(3)	5(3)	52(5)	11(5)	27(3)	1.5(3)	59(5)	0.1(3)	987(5)	48	10.0
10.90	D	08/25/1999	105	25(5)	2(3)	5(5)	5(3)	4(3)	52(5)	13(5)	26(3)	2.6(3)	64(5)	0.1(5)	944(5)	50	9.9
9.90	D	08/05/1999	112	29(5)	1(1)	4(3)	5(3)	6(5)	44(5)	11(5)	14(5)	1.9(3)	68(5)	0.4(3)	1260(5)	48	10.2
9.90	D	08/25/1999	112	26(5)	2(3)	4(3)	4(3)	4(3)	46(5)	15(5)	21(3)	1.7(3)	65(5)	0.0(5)	1479(5)	48	10.1
9.00	D	07/28/1999	114	29(5)	2(3)	5(5)	6(5)	6(5)	40(5)	23(3)	21(3)	2.6(3)	70(5)	0.1(3)	860(5)	50	9.5
9.00	D	08/25/1999	114	26(5)	1(1)	3(3)	5(3)	4(3)	36(3)	23(3)	29(3)	3.4(3)	59(5)	0.1(3)	792(5)	40	9.8
8.40	D	07/28/1999	125	25(5)	3(3)	3(3)	4(3)	4(3)	36(5)	18(5)	16(5)	1.5(3)	56(5)	0.0(5)	1064(5)	50	9.1
8.40	D	08/25/1999	125	29(5)	3(3)	3(3)	4(3)	6(5)	38(5)	22(3)	20(3)	2.2(3)	56(5)	0.5(3)	968(5)	46	9.6

na - Qualitative data, Modified Iwb not applicable.

▲ - IBI is low end adjusted.

* - < 200 Total individuals in sample

** - < 50 Total individuals in sample

● - One or more species excluded from IBI calculation.

Species List

River Code: **08-200**	Stream: **Middle Fork Little Beaver Creek**	Sample Date: **07/12/1999**
River Mile: ***40.30***	*Basin:* *Little Beaver Creek*	
Data Source: 01	Time Fished: 3051 sec Drain Area: 1.7 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.15 km Depth: 20 cm Flow: C	Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Mudminnow		I	C	T	1	2.00	0.21			
White Sucker	W	O	S	T	37	74.00	7.86			
Blacknose Dace	N	G	S	T	176	352.00	37.37			
Creek Chub	N	G	N	T	118	236.00	25.05			
Bluntnose Minnow	N	O	C	T	95	190.00	20.17			
Central Stoneroller	N	H	N		4	8.00	0.85			
Green Sunfish	S	I	C	T	1	2.00	0.21			
Pumpkinseed Sunfish	S	I	C	P	1	2.00	0.21			
Johnny Darter	D	I	C		6	12.00	1.27			
Brook Stickleback		I	C		32	64.00	6.79			
	Date Total				471	942.00				
	Number of Species				10					
	Number of Hybrids				0					

River Code: **08-200**	Stream: **Middle Fork Little Beaver Creek**	Sample Date: **08/23/1999**
River Mile: **40.30**	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 3417 sec Drain Area: 1.7 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.15 km Depth: 10 cm Flow: C	Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
White Sucker	W	O	S	T	16	32.00	1.54			
Blacknose Dace	N	G	S	T	342	684.00	32.92			
Creek Chub	N	G	N	T	162	324.00	15.59			
Bluntnose Minnow	N	O	C	T	467	934.00	44.95			
Central Stoneroller	N	H	N		1	2.00	0.10			
Pumpkinseed Sunfish	S	I	C	P	1	2.00	0.10			
Johnny Darter	D	I	C		14	28.00	1.35			
Brook Stickleback		I	C		36	72.00	3.46			
Date Total					1,039	2,078.00				
Number of Species					8					
Number of Hybrids					0					

Species List

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 1999
River Mile: 40.30	Basin: Little Beaver Creek	Date Range: 07/12/1999
	Time Fished: 6468 sec Drain Area: 1.7 sq mi	Thru: 08/23/1999
	Dist Fished: 0.30 km No of Passes: 2	Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Mudminnow		I	C	T	1	1.00	0.07			
White Sucker	W	O	S	T	53	53.00	3.51			
Blacknose Dace	N	G	S	T	518	518.00	34.30			
Creek Chub	N	G	N	T	280	280.00	18.54			
Bluntnose Minnow	N	O	C	T	562	562.00	37.22			
Central Stoneroller	N	H	N		5	5.00	0.33			
Green Sunfish	S	I	C	T	1	1.00	0.07			
Pumpkinseed Sunfish	S	I	C	P	2	2.00	0.13			
Johnny Darter	D	I	C		20	20.00	1.32			
Brook Stickleback		I	C		68	68.00	4.50			
	Mile Total				1,510	1,510.00				
	Number of Species				10					
	Number of Hybrids				0					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 07/12/1999
River Mile: 38.20	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 2522 sec Drain Area: 4.2 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.16 km Depth: 15 cm Flow: C	Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
White Sucker	W	O	S	T	37	69.38	4.76			
Golden Shiner	N	I	M	T	1	1.88	0.13			
Blacknose Dace	N	G	S	T	13	24.38	1.67			
Creek Chub	N	G	N	T	208	390.00	26.74			
Fathead Minnow	N	O	C	T	31	58.13	3.98			
Bluntnose Minnow	N	O	C	T	6	11.25	0.77			
Central Stoneroller	N	H	N		470	881.25	60.41			
Yellow Bullhead		I	C	T	4	7.50	0.51			
Bluegill Sunfish	S	I	C	P	1	1.88	0.13			
Pumpkinseed Sunfish	S	I	C	P	3	5.63	0.39			
Johnny Darter	D	I	C		3	5.63	0.39			
Brook Stickleback		I	C		1	1.88	0.13			
Date Total					778	1,458.75				
Number of Species					12					
Number of Hybrids					0					

Species List

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 08/24/1999
River Mile: 38.20	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 3672 sec Drain Area: 4.2 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.16 km Depth: 15 cm Flow: C	Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Mudminnow		I	C	T	2	3.75	0.15			
White Sucker	W	O	S	T	443	830.63	33.89			
Golden Shiner	N	I	M	T	6	11.25	0.46			
Blacknose Dace	N	G	S	T	173	324.38	13.24			
Creek Chub	N	G	N	T	401	751.88	30.68			
Fathead Minnow	N	O	C	T	41	76.88	3.14			
Bluntnose Minnow	N	O	C	T	6	11.25	0.46			
Central Stoneroller	N	H	N		192	360.00	14.69			
Yellow Bullhead		I	C	T	1	1.88	0.08			
Green Sunfish	S	I	C	T	6	11.25	0.46			
Bluegill Sunfish	S	I	C	P	4	7.50	0.31			
Pumpkinseed Sunfish	S	I	C	P	4	7.50	0.31			
Johnny Darter	D	I	C		27	50.63	2.07			
Fantail Darter	D	I	C		1	1.88	0.08			
Date Total					1,307	2,450.63				
Number of Species					14					
Number of Hybrids					0					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 1999
River Mile: 38.20	Basin: Little Beaver Creek	Date Range: 07/12/1999
	Time Fished: 6194 sec Drain Area: 4.2 sq mi	Thru: 08/24/1999
	Dist Fished: 0.32 km No of Passes: 2	Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Mudminnow		I	C	T	2	1.88	0.10			
White Sucker	W	O	S	T	480	450.00	23.02			
Golden Shiner	N	I	M	T	7	6.56	0.34			
Blacknose Dace	N	G	S	T	186	174.38	8.92			
Creek Chub	N	G	N	T	609	570.94	29.21			
Fathead Minnow	N	O	C	T	72	67.50	3.45			
Bluntnose Minnow	N	O	C	T	12	11.25	0.58			
Central Stoneroller	N	H	N		662	620.63	31.75			
Yellow Bullhead		I	C	T	5	4.69	0.24			
Green Sunfish	S	I	C	T	6	5.63	0.29			
Bluegill Sunfish	S	I	C	P	5	4.69	0.24			
Pumpkinseed Sunfish	S	I	C	P	7	6.56	0.34			
Johnny Darter	D	I	C		30	28.13	1.44			
Fantail Darter	D	I	C		1	0.94	0.05			
Brook Stickleback		I	C		1	0.94	0.05			
Mile Total					2,085	1,954.69				
Number of Species					15					
Number of Hybrids					0					

Species List

River Code: **08-200**	Stream: **Middle Fork Little Beaver Creek**	Sample Date: **07/12/1999**
River Mile: **37.70**	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 2097 sec Drain Area: 6.1 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.20 km Depth: 25 cm Flow: C	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
White Sucker	W	O	S	T	136	204.00	39.88			
Blacknose Dace	N	G	S	T	25	37.50	7.33			
Creek Chub	N	G	N	T	55	82.50	16.13			
Fathead Minnow	N	O	C	T	17	25.50	4.99			
Bluntnose Minnow	N	O	C	T	24	36.00	7.04			
Central Stoneroller	N	H	N		55	82.50	16.13			
Yellow Bullhead		I	C	T	3	4.50	0.88			
Largemouth Bass	F	C	C		1	1.50	0.29			
Green Sunfish	S	I	C	T	2	3.00	0.59			
Bluegill Sunfish	S	I	C	P	8	12.00	2.35			
Pumpkinseed Sunfish	S	I	C	P	4	6.00	1.17			
Johnny Darter	D	I	C		10	15.00	2.93			
Mottled Sculpin		I	C		1	1.50	0.29			
	Date Total				341	511.50				
	Number of Species				13					
	Number of Hybrids				0					

River Code: **08-200**	Stream: **Middle Fork Little Beaver Creek**	Sample Date: **08/23/1999**
River Mile: **37.70**	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 2150 sec Drain Area: 6.1 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.20 km Depth: 30 cm Flow: C	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
White Sucker	W	O	S	T	173	259.50	39.77			
Blacknose Dace	N	G	S	T	33	49.50	7.59			
Creek Chub	N	G	N	T	82	123.00	18.85			
Silverjaw Minnow	N	I	M		4	6.00	0.92			
Fathead Minnow	N	O	C	T	6	9.00	1.38			
Bluntnose Minnow	N	O	C	T	20	30.00	4.60			
Central Stoneroller	N	H	N		47	70.50	10.80			
Bluegill Sunfish	S	I	C	P	11	16.50	2.53			
Pumpkinseed Sunfish	S	I	C	P	3	4.50	0.69			
Johnny Darter	D	I	C		48	72.00	11.03			
Fantail Darter	D	I	C		8	12.00	1.84			
	Date Total				435	652.50				
	Number of Species				11					
	Number of Hybrids				0					

River Code: 08-200 River Mile: 37.70	Stream: Middle Fork Little Beaver Creek Basin: Little Beaver Creek Time Fished: 4247 sec Drain Area: 6.1 sq mi Dist Fished: 0.40 km No of Passes: 2	Sample Date: 1999 Date Range: 07/12/1999 Thru: 08/23/1999 Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
White Sucker	W	O	S	T	309	231.75	39.82			
Blacknose Dace	N	G	S	T	58	43.50	7.47			
Creek Chub	N	G	N	T	137	102.75	17.65			
Silverjaw Minnow	N	I	M		4	3.00	0.52			
Fathead Minnow	N	O	C	T	23	17.25	2.96			
Bluntnose Minnow	N	O	C	T	44	33.00	5.67			
Central Stoneroller	N	H	N		102	76.50	13.14			
Yellow Bullhead		I	C	T	3	2.25	0.39			
Largemouth Bass	F	C	C		1	0.75	0.13			
Green Sunfish	S	I	C	T	2	1.50	0.26			
Bluegill Sunfish	S	I	C	P	19	14.25	2.45			
Pumpkinseed Sunfish	S	I	C	P	7	5.25	0.90			
Johnny Darter	D	I	C		58	43.50	7.47			
Fantail Darter	D	I	C		8	6.00	1.03			
Mottled Sculpin		I	C		1	0.75	0.13			
Mile Total					776	582.00				
Number of Species					15					
Number of Hybrids					0					

River Code: **08-200**	Stream: **Middle Fork Little Beaver Creek**	Sample Date: **07/13/1999**
River Mile: **36.70**	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 3606 sec Drain Area: 8.3 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.20 km Depth: 30 cm Flow: C	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
White Sucker	W	O	S	T	133	199.50	33.59			
Blacknose Dace	N	G	S	T	8	12.00	2.02			
Creek Chub	N	G	N	T	78	117.00	19.70			
Striped Shiner	N	I	S		1	1.50	0.25			
Fathead Minnow	N	O	C	T	10	15.00	2.53			
Bluntnose Minnow	N	O	C	T	28	42.00	7.07			
Central Stoneroller	N	H	N		112	168.00	28.28			
Green Sunfish	S	I	C	T	2	3.00	0.51			
Bluegill Sunfish	S	I	C	P	4	6.00	1.01			
Johnny Darter	D	I	C		11	16.50	2.78			
Fantail Darter	D	I	C		2	3.00	0.51			
Mottled Sculpin		I	C		7	10.50	1.77			
Date Total					396	594.00				
Number of Species					12					
Number of Hybrids					0					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 08/23/1999
River Mile: 36.70	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 2627 sec Drain Area: 8.3 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.20 km Depth: 40 cm Flow: C	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
White Sucker	W	O	S	T	117	175.50	20.28			
Blacknose Dace	N	G	S	T	41	61.50	7.11			
Creek Chub	N	G	N	T	171	256.50	29.64			
Striped Shiner	N	I	S		1	1.50	0.17			
Silverjaw Minnow	N	I	M		1	1.50	0.17			
Fathead Minnow	N	O	C	T	27	40.50	4.68			
Bluntnose Minnow	N	O	C	T	43	64.50	7.45			
Central Stoneroller	N	H	N		150	225.00	26.00			
Green Sunfish	S	I	C	T	1	1.50	0.17			
Bluegill Sunfish	S	I	C	P	4	6.00	0.69			
Johnny Darter	D	I	C		15	22.50	2.60			
Mottled Sculpin		I	C		6	9.00	1.04			
Date Total					577	865.50				
Number of Species					12					
Number of Hybrids					0					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 1999
River Mile: 36.70	Basin: Little Beaver Creek	Date Range: 07/13/1999
	Time Fished: 6233 sec Drain Area: 8.3 sq mi	Thru: 08/23/1999
	Dist Fished: 0.40 km No of Passes: 2	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
White Sucker	W	O	S	T	250	187.50	25.69			
Blacknose Dace	N	G	S	T	49	36.75	5.04			
Creek Chub	N	G	N	T	249	186.75	25.59			
Striped Shiner	N	I	S		2	1.50	0.21			
Silverjaw Minnow	N	I	M		1	0.75	0.10			
Fathead Minnow	N	O	C	T	37	27.75	3.80			
Bluntnose Minnow	N	O	C	T	71	53.25	7.30			
Central Stoneroller	N	H	N		262	196.50	26.93			
Green Sunfish	S	I	C	T	3	2.25	0.31			
Bluegill Sunfish	S	I	C	P	8	6.00	0.82			
Johnny Darter	D	I	C		26	19.50	2.67			
Fantail Darter	D	I	C		2	1.50	0.21			
Mottled Sculpin		I	C		13	9.75	1.34			
	Mile Total				973	729.75				
	Number of Species				13					
	Number of Hybrids				0					

River Code: **08-200**	Stream: **Middle Fork Little Beaver Creek**	Sample Date: **07/13/1999**
River Mile: **33.30**	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 3606 sec Drain Area: 17.9 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.20 km Depth: 50 cm Flow: C	Sampler Type: D

Species Name / *ODNR status*	IBI *Grp*	Feed *Guild*	Breed *Guild*	*Tol*	# of *Fish*	Relative *Number*	% by *Number*	Relative *Weight*	% by *Weight*	Ave(gm) *Weight*
Northern Hog Sucker	R	I	S	M	1	1.50	0.22			
White Sucker	W	O	S	T	40	60.00	8.62			
Common Carp	G	O	M	T	4	6.00	0.86			
Blacknose Dace	N	G	S	T	22	33.00	4.74			
Creek Chub	N	G	N	T	71	106.50	15.30			
Striped Shiner	N	I	S		3	4.50	0.65			
Fathead Minnow	N	O	C	T	1	1.50	0.22			
Bluntnose Minnow	N	O	C	T	18	27.00	3.88			
Central Stoneroller	N	H	N		209	313.50	45.04			
Yellow Bullhead		I	C	T	3	4.50	0.65			
Green Sunfish	S	I	C	T	2	3.00	0.43			
Johnny Darter	D	I	C		31	46.50	6.68			
Greenside Darter	D	I	S	M	5	7.50	1.08			
Rainbow Darter	D	I	S	M	2	3.00	0.43			
Mottled Sculpin		I	C		52	78.00	11.21			
	Date Total				*464*	*696.00*				
	Number of Species				15					
	Number of Hybrids				0					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 08/24/1999
River Mile: 33.30	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 3295 sec Drain Area: 17.9 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.20 km Depth: 40 cm Flow: C	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Northern Hog Sucker	R	I	S	M	3	4.50	0.38			
White Sucker	W	O	S	T	85	127.50	10.88			
Blacknose Dace	N	G	S	T	64	96.00	8.19			
Creek Chub	N	G	N	T	126	189.00	16.13			
Striped Shiner	N	I	S		9	13.50	1.15			
Fathead Minnow	N	O	C	T	1	1.50	0.13			
Bluntnose Minnow	N	O	C	T	40	60.00	5.12			
Central Stoneroller	N	H	N		338	507.00	43.28			
Yellow Bullhead		I	C	T	3	4.50	0.38			
Green Sunfish	S	I	C	T	6	9.00	0.77			
Pumpkinseed Sunfish	S	I	C	P	2	3.00	0.26			
Green Sf X Pumpkinseed					1	1.50	0.13			
Johnny Darter	D	I	C		53	79.50	6.79			
Greenside Darter	D	I	S	M	5	7.50	0.64			
Rainbow Darter	D	I	S	M	1	1.50	0.13			
Mottled Sculpin		I	C		44	66.00	5.63			
	Date Total				781	1,171.50				
	Number of Species				15					
	Number of Hybrids				1					

River Code: 08-200 River Mile: 33.30	Stream: Middle Fork Little Beaver Creek Basin: Little Beaver Creek Time Fished: 6901 sec Drain Area: 17.9 sq mi Dist Fished: 0.40 km No of Passes: 2	Sample Date: 1999 Date Range: 07/13/1999 Thru: 08/24/1999 Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Northern Hog Sucker	R	I	S	M	4	3.00	0.32			
White Sucker	W	O	S	T	125	93.75	10.04			
Common Carp	G	O	M	T	4	3.00	0.32			
Blacknose Dace	N	G	S	T	86	64.50	6.91			
Creek Chub	N	G	N	T	197	147.75	15.82			
Striped Shiner	N	I	S		12	9.00	0.96			
Fathead Minnow	N	O	C	T	2	1.50	0.16			
Bluntnose Minnow	N	O	C	T	58	43.50	4.66			
Central Stoneroller	N	H	N		547	410.25	43.94			
Yellow Bullhead		I	C	T	6	4.50	0.48			
Green Sunfish	S	I	C	T	8	6.00	0.64			
Pumpkinseed Sunfish	S	I	C	P	2	1.50	0.16			
Green Sf X Pumpkinseed					1	0.75	0.08			
Johnny Darter	D	I	C		84	63.00	6.75			
Greenside Darter	D	I	S	M	10	7.50	0.80			
Rainbow Darter	D	I	S	M	3	2.25	0.24			
Mottled Sculpin		I	C		96	72.00	7.71			
Mile Total					1,245	933.75				
Number of Species					16					
Number of Hybrids					1					

River Code: **08-200**	Stream: **Middle Fork Little Beaver Creek**	Sample Date: **07/13/1999**
River Mile: **32.00**	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 2265 sec Drain Area: 18.9 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.20 km Depth: 40 cm Flow: C	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Northern Hog Sucker	R	I	S	M	5	7.50	0.79	0.26	3.14	34.00
White Sucker	W	O	S	T	32	48.00	5.04	1.82	22.34	37.83
Blacknose Dace	N	G	S	T	65	97.50	10.24	0.45	5.47	4.56
Creek Chub	N	G	N	T	61	91.50	9.61	1.47	18.03	16.02
Striped Shiner	N	I	S		6	9.00	0.94	0.13	1.54	13.83
Silverjaw Minnow	N	I	M		1	1.50	0.16	0.01	0.07	4.00
Bluntnose Minnow	N	O	C	T	41	61.50	6.46	0.28	3.39	4.49
Central Stoneroller	N	H	N		384	576.00	60.47	3.25	39.91	5.63
Yellow Bullhead		I	C	T	2	3.00	0.31	0.23	2.83	76.50
Pumpkinseed Sunfish	S	I	C	P	1	1.50	0.16	0.02	0.26	14.00
Johnny Darter	D	I	C		20	30.00	3.15	0.06	0.70	1.89
Greenside Darter	D	I	S	M	10	15.00	1.57	0.07	0.84	4.50
Mottled Sculpin		I	C		7	10.50	1.10	0.12	1.51	11.71
	Date Total				635	952.50		8.13		
	Number of Species				13					
	Number of Hybrids				0					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 08/24/1999
River Mile: 32.00	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 3817 sec Drain Area: 18.9 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.20 km Depth: 30 cm Flow: C	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Northern Hog Sucker	R	I	S	M	7	10.50	0.83	0.53	5.68	50.86
White Sucker	W	O	S	T	94	141.00	11.19	2.07	22.00	14.66
Blacknose Dace	N	G	S	T	73	109.50	8.69	0.39	4.18	3.59
Creek Chub	N	G	N	T	120	180.00	14.29	1.72	18.27	9.54
Striped Shiner	N	I	S		6	9.00	0.71	0.04	0.45	4.67
Silverjaw Minnow	N	I	M		4	6.00	0.48	0.02	0.21	3.25
Fathead Minnow	N	O	C	T	4	6.00	0.48	0.01	0.10	1.50
Bluntnose Minnow	N	O	C	T	63	94.50	7.50	0.34	3.58	3.56
Central Stoneroller	N	H	N		400	600.00	47.62	3.30	35.12	5.50
Yellow Bullhead		I	C	T	6	9.00	0.71	0.61	6.51	68.00
Pumpkinseed Sunfish	S	I	C	P	1	1.50	0.12	0.05	0.51	32.00
Johnny Darter	D	I	C		53	79.50	6.31	0.20	2.08	2.45
Greenside Darter	D	I	S	M	7	10.50	0.83	0.07	0.70	6.29
Mottled Sculpin		I	C		2	3.00	0.24	0.06	0.64	20.00
	Date Total				840	1,260.00		9.40		
	Number of Species				14					
	Number of Hybrids				0					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 08/24/1999
River Mile: 28.80	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 1857 sec Drain Area: 26.0 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.20 km Depth: 50 cm Flow: C	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Mudminnow		I	C	T	1	1.50	0.43	0.01	0.01	5.00
Grass Pickerel		P	M	P	9	13.50	3.86	0.48	0.74	35.67
Northern Hog Sucker	R	I	S	M	1	1.50	0.43	0.07	0.11	48.00
White Sucker	W	O	S	T	107	160.50	45.92	21.07	32.31	131.30
Common Carp	G	O	M	T	11	16.50	4.72	39.39	60.40	2,387.50
Creek Chub	N	G	N	T	12	18.00	5.15	0.07	0.11	4.00
Striped Shiner	N	I	S		9	13.50	3.86	0.50	0.76	36.89
Bluntnose Minnow	N	O	C	T	6	9.00	2.58	0.04	0.06	4.00
Central Stoneroller	N	H	N		1	1.50	0.43	0.06	0.09	38.00
Yellow Bullhead		I	C	T	9	13.50	3.86	1.08	1.66	80.00
Brown Bullhead		I	C	T	2	3.00	0.86	0.17	0.26	55.50
Black Bullhead		I	C	P	1	1.50	0.43	0.15	0.23	100.00
White Crappie	S	I	C		2	3.00	0.86	0.15	0.23	50.00
Largemouth Bass	F	C	C		4	6.00	1.72	0.50	0.76	83.00
Green Sunfish	S	I	C	T	27	40.50	11.59	0.63	0.96	15.44
Bluegill Sunfish	S	I	C	P	6	9.00	2.58	0.46	0.70	50.67
Pumpkinseed Sunfish	S	I	C	P	21	31.50	9.01	0.37	0.56	11.62
Johnny Darter	D	I	C		2	3.00	0.86	0.01	0.01	2.00
Greenside Darter	D	I	S	M	1	1.50	0.43	0.00	0.00	2.00
Mottled Sculpin		I	C		1	1.50	0.43	0.03	0.05	22.00
	Date Total				233	349.50		65.23		
	Number of Species				20					
	Number of Hybrids				0					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 1999
River Mile: 25.80	Basin: Little Beaver Creek	Date Range: 07/14/1999
	Time Fished: 3396 sec Drain Area: 32.0 sq mi	Thru: 08/24/1999
	Dist Fished: 0.44 km No of Passes: 2	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Grass Pickerel		P	M	P	13	8.86	5.33	0.18	0.42	20.08
Northern Hog Sucker	R	I	S	M	14	9.55	5.74	1.29	3.05	135.14
White Sucker	W	O	S	T	101	68.86	41.39	11.17	26.44	162.23
Common Carp	G	O	M	T	12	8.18	4.92	27.80	65.80	3,397.92
Creek Chub	N	G	N	T	1	0.68	0.41	0.04	0.09	58.00
Striped Shiner	N	I	S		7	4.77	2.87	0.16	0.38	33.71
Bluntnose Minnow	N	O	C	T	25	17.05	10.25	0.07	0.16	3.96
Central Stoneroller	N	H	N		5	3.41	2.05	0.11	0.26	32.60
Yellow Bullhead		I	C	T	10	6.82	4.10	0.63	1.49	92.50
White Crappie	S	I	C		3	2.05	1.23	0.20	0.48	99.00
Largemouth Bass	F	C	C		12	8.18	4.92	0.09	0.22	11.25
Green Sunfish	S	I	C	T	5	3.41	2.05	0.13	0.30	36.60
Bluegill Sunfish	S	I	C	P	4	2.73	1.64	0.11	0.26	40.50
Pumpkinseed Sunfish	S	I	C	P	9	6.14	3.69	0.20	0.46	31.78
Bluegill X Pumpkinseed					1	0.68	0.41	0.01	0.02	14.00
Blackside Darter	D	I	S		1	0.68	0.41	0.00	0.01	6.00
Johnny Darter	D	I	C		11	7.50	4.51	0.01	0.02	1.18
Greenside Darter	D	I	S	M	3	2.05	1.23	0.01	0.03	5.33
Rainbow Darter	D	I	S	M	1	0.68	0.41	0.00	0.00	2.00
Mottled Sculpin		I	C		6	4.09	2.46	0.04	0.09	9.50
	Mile Total				244	166.36		42.25		
	Number of Species				19					
	Number of Hybrids				1					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 08/25/1999
River Mile: 23.50	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 2270 sec Drain Area: 36.0 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.20 km Depth: 70 cm Flow: C	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Grass Pickerel		P	M	P	4	6.00	2.03	0.11	0.64	17.50
Northern Hog Sucker	R	I	S	M	18	27.00	9.14	2.20	13.47	81.39
White Sucker	W	O	S	T	35	52.50	17.77	4.67	28.58	88.85
Common Carp	G	O	M	T	1	1.50	0.51	5.85	35.84	3,900.00
Creek Chub	N	G	N	T	35	52.50	17.77	0.29	1.80	5.60
Striped Shiner	N	I	S		12	18.00	6.09	0.42	2.57	23.33
Bluntnose Minnow	N	O	C	T	7	10.50	3.55	0.05	0.29	4.57
Central Stoneroller	N	H	N		23	34.50	11.68	0.89	5.42	25.65
Yellow Bullhead		I	C	T	1	1.50	0.51	0.29	1.75	190.00
Largemouth Bass	F	C	C		3	4.50	1.52	0.58	3.58	129.67
Green Sunfish	S	I	C	T	3	4.50	1.52	0.20	1.19	43.33
Bluegill Sunfish	S	I	C	P	9	13.50	4.57	0.51	3.12	37.78
Pumpkinseed Sunfish	S	I	C	P	1	1.50	0.51	0.02	0.13	14.00
Johnny Darter	D	I	C		1	1.50	0.51	0.00	0.01	1.00
Greenside Darter	D	I	S	M	21	31.50	10.66	0.06	0.39	2.00
Rainbow Darter	D	I	S	M	7	10.50	3.55	0.05	0.28	4.29
Fantail Darter	D	I	C		1	1.50	0.51	0.00	0.02	2.00
Mottled Sculpin		I	C		15	22.50	7.61	0.15	0.92	6.67
	Date Total				197	295.50		16.32		
	Number of Species				18					
	Number of Hybrids				0					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 1999
River Mile: 23.50	Basin: Little Beaver Creek	Date Range: 07/14/1999
	Time Fished: 4137 sec Drain Area: 36.0 sq mi	Thru: 08/25/1999
	Dist Fished: 0.40 km No of Passes: 2	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Mudminnow		I	C	T	2	1.50	0.57	0.01	0.03	4.50
Grass Pickerel		P	M	P	5	3.75	1.43	0.10	0.42	26.00
Northern Hog Sucker	R	I	S	M	28	21.00	8.00	2.28	9.81	108.43
White Sucker	W	O	S	T	40	30.00	11.43	2.62	11.29	87.37
Common Carp	G	O	M	T	7	5.25	2.00	15.00	64.60	2,857.14
Creek Chub	N	G	N	T	39	29.25	11.14	0.24	1.01	8.05
Striped Shiner	N	I	S		22	16.50	6.29	0.35	1.50	21.06
Bluntnose Minnow	N	O	C	T	14	10.50	4.00	0.05	0.20	4.50
Central Stoneroller	N	H	N		91	68.25	26.00	1.07	4.59	15.60
Yellow Bullhead		I	C	T	2	1.50	0.57	0.35	1.49	230.00
Black Crappie	S	I	C		1	0.75	0.29	0.04	0.18	55.00
Largemouth Bass	F	C	C		4	3.00	1.14	0.29	1.27	98.00
Green Sunfish	S	I	C	T	3	2.25	0.86	0.10	0.42	43.33
Bluegill Sunfish	S	I	C	P	17	12.75	4.86	0.49	2.10	38.29
Pumpkinseed Sunfish	S	I	C	P	4	3.00	1.14	0.03	0.14	11.00
Johnny Darter	D	I	C		2	1.50	0.57	0.00	0.01	1.50
Greenside Darter	D	I	S	M	38	28.50	10.86	0.08	0.35	2.84
Rainbow Darter	D	I	S	M	8	6.00	2.29	0.02	0.10	4.00
Fantail Darter	D	I	C		1	0.75	0.29	0.00	0.01	2.00
Mottled Sculpin		I	C		22	16.50	6.29	0.11	0.49	6.91
	Mile Total				350	262.50		23.22		
	Number of Species				20					
	Number of Hybrids				0					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 08/25/1999
River Mile: 21.80	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 1857 sec Drain Area: 41.0 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.20 km Depth: 50 cm Flow: C	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Mudminnow		I	C	T	1	1.50	0.33	0.01	0.02	3.00
Grass Pickerel		P	M	P	5	7.50	1.63	0.21	0.76	27.60
Northern Hog Sucker	R	I	S	M	36	54.00	11.73	8.33	30.39	154.25
White Sucker	W	O	S	T	51	76.50	16.61	10.24	37.35	133.86
Common Carp	G	O	M	T	2	3.00	0.65	3.61	13.15	1,202.00
Creek Chub	N	G	N	T	22	33.00	7.17	0.98	3.58	29.73
Striped Shiner	N	I	S		6	9.00	1.95	0.49	1.78	54.17
Silverjaw Minnow	N	I	M		1	1.50	0.33	0.00	0.01	2.00
Bluntnose Minnow	N	O	C	T	58	87.00	18.89	0.27	0.98	3.10
Central Stoneroller	N	H	N		42	63.00	13.68	0.86	3.12	13.57
Yellow Bullhead		I	C	T	4	6.00	1.30	0.40	1.46	66.50
Rock Bass	S	C	C		15	22.50	4.89	1.31	4.79	58.36
Largemouth Bass	F	C	C		2	3.00	0.65	0.37	1.34	122.00
Green Sunfish	S	I	C	T	1	1.50	0.33	0.02	0.08	15.00
Johnny Darter	D	I	C		13	19.50	4.23	0.03	0.12	1.69
Greenside Darter	D	I	S	M	19	28.50	6.19	0.10	0.35	3.37
Rainbow Darter	D	I	S	M	5	7.50	1.63	0.02	0.07	2.40
Fantail Darter	D	I	C		1	1.50	0.33	0.00	0.01	2.00
Mottled Sculpin		I	C		23	34.50	7.49	0.18	0.66	5.22
Date Total					307	460.50		27.41		
Number of Species					19					
Number of Hybrids					0					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 1999
River Mile: 21.80	Basin: Little Beaver Creek	Date Range: 07/14/1999
	Time Fished: 3979 sec Drain Area: 41.0 sq mi	Thru: 08/25/1999
	Dist Fished: 0.40 km No of Passes: 2	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Mudminnow		I	C	T	1	0.75	0.21	0.00	0.01	3.00
Grass Pickerel		P	M	P	6	4.50	1.24	0.11	0.57	24.00
Northern Hog Sucker	R	I	S	M	48	36.00	9.92	5.29	27.97	147.04
White Sucker	W	O	S	T	71	53.25	14.67	7.38	38.98	138.55
Common Carp	G	O	M	T	2	1.50	0.41	1.80	9.53	1,202.00
Creek Chub	N	G	N	T	30	22.50	6.20	0.68	3.57	30.02
Striped Shiner	N	I	S		9	6.75	1.86	0.31	1.62	45.44
Silverjaw Minnow	N	I	M		5	3.75	1.03	0.01	0.08	3.80
Bluntnose Minnow	N	O	C	T	85	63.75	17.56	0.21	1.10	3.27
Central Stoneroller	N	H	N		55	41.25	11.36	0.50	2.66	12.20
Yellow Bullhead		I	C	T	7	5.25	1.45	0.38	2.02	72.71
Rock Bass	S	C	C		26	19.50	5.37	1.67	8.82	85.55
Largemouth Bass	F	C	C		2	1.50	0.41	0.18	0.97	122.00
Green Sunfish	S	I	C	T	1	0.75	0.21	0.01	0.06	15.00
Johnny Darter	D	I	C		16	12.00	3.31	0.02	0.11	1.69
Greenside Darter	D	I	S	M	33	24.75	6.82	0.08	0.43	3.30
Rainbow Darter	D	I	S	M	25	18.75	5.17	0.03	0.15	1.48
Fantail Darter	D	I	C		4	3.00	0.83	0.01	0.03	1.75
Mottled Sculpin		I	C		58	43.50	11.98	0.26	1.35	5.86
	Mile Total				484	363.00		18.93		
	Number of Species				19					
	Number of Hybrids				0					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 08/25/1999
River Mile: 20.90	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 2031 sec Drain Area: 73.0 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.25 km Depth: 60 cm Flow: C	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Grass Pickerel		P	M	P	2	2.40	1.55	0.10	0.60	41.00
Northern Hog Sucker	R	I	S	M	11	13.20	8.53	0.71	4.35	53.55
White Sucker	W	O	S	T	10	12.00	7.75	1.94	11.91	161.30
Common Carp	G	O	M	T	1	1.20	0.78	5.52	33.95	4,600.00
Striped Shiner	N	I	S		7	8.40	5.43	0.14	0.85	16.57
Bluntnose Minnow	N	O	C	T	7	8.40	5.43	0.02	0.11	2.14
Yellow Bullhead		I	C	T	9	10.80	6.98	1.34	8.25	124.22
White Crappie	S	I	C		3	3.60	2.33	0.53	3.27	147.67
Black Crappie	S	I	C		2	2.40	1.55	0.35	2.17	147.00
Rock Bass	S	C	C		19	22.80	14.73	1.59	9.79	69.84
Largemouth Bass	F	C	C		16	19.20	12.40	1.76	10.83	91.69
Green Sunfish	S	I	C	T	1	1.20	0.78	0.00	0.01	2.00
Bluegill Sunfish	S	I	C	P	38	45.60	29.46	2.19	13.48	48.04
Pumpkinseed Sunfish	S	I	C	P	2	2.40	1.55	0.07	0.41	27.50
Fantail Darter	D	I	C		1	1.20	0.78	0.00	0.01	2.00
	Date Total				129	154.80		16.26		
	Number of Species				15					
	Number of Hybrids				0					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 1999
River Mile: 20.90	Basin: Little Beaver Creek	Date Range: 08/25/1999
	Time Fished: 2031 sec Drain Area: 73.0 sq mi	
	Dist Fished: 0.25 km No of Passes: 1	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Grass Pickerel		P	M	P	2	2.40	1.55	0.10	0.60	41.00
Northern Hog Sucker	R	I	S	M	11	13.20	8.53	0.71	4.35	53.55
White Sucker	W	O	S	T	10	12.00	7.75	1.94	11.91	161.30
Common Carp	G	O	M	T	1	1.20	0.78	5.52	33.95	4,600.00
Striped Shiner	N	I	S		7	8.40	5.43	0.14	0.85	16.57
Bluntnose Minnow	N	O	C	T	7	8.40	5.43	0.02	0.11	2.14
Yellow Bullhead		I	C	T	9	10.80	6.98	1.34	8.25	124.22
White Crappie	S	I	C		3	3.60	2.33	0.53	3.27	147.67
Black Crappie	S	I	C		2	2.40	1.55	0.35	2.17	147.00
Rock Bass	S	C	C		19	22.80	14.73	1.59	9.79	69.84
Largemouth Bass	F	C	C		16	19.20	12.40	1.76	10.83	91.69
Green Sunfish	S	I	C	T	1	1.20	0.78	0.00	0.01	2.00
Bluegill Sunfish	S	I	C	P	38	45.60	29.46	2.19	13.48	48.04
Pumpkinseed Sunfish	S	I	C	P	2	2.40	1.55	0.07	0.41	27.50
Fantail Darter	D	I	C		1	1.20	0.78	0.00	0.01	2.00
	Mile Total				129	154.80		16.26		
	Number of Species				15					
	Number of Hybrids				0					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 07/15/1999
River Mile: 15.00	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 2262 sec Drain Area: 96.0 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.20 km Depth: 50 cm Flow: C	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Northern Hog Sucker	R	I	S	M	27	40.50	7.52	8.07	61.09	199.20
White Sucker	W	O	S	T	29	43.50	8.08	2.56	19.39	58.86
Blacknose Dace	N	G	S	T	2	3.00	0.56	0.01	0.07	3.00
Creek Chub	N	G	N	T	10	15.00	2.79	0.31	2.33	20.50
Bluntnose Minnow	N	O	C	T	7	10.50	1.95	0.07	0.50	6.29
Central Stoneroller	N	H	N		24	36.00	6.69	0.33	2.48	9.09
Rock Bass	S	C	C		1	1.50	0.28	0.09	0.68	60.00
Largemouth Bass	F	C	C		1	1.50	0.28	0.00	0.02	1.00
Johnny Darter	D	I	C		8	12.00	2.23	0.02	0.18	2.00
Greenside Darter	D	I	S	M	30	45.00	8.36	0.10	0.77	2.27
Rainbow Darter	D	I	S	M	28	42.00	7.80	0.09	0.67	2.11
Fantail Darter	D	I	C		24	36.00	6.69	0.08	0.63	2.29
Mottled Sculpin		I	C		168	252.00	46.80	1.48	11.21	5.88
	Date Total				359	538.50		13.21		
	Number of Species				13					
	Number of Hybrids				0					

River Code: **08-200**	Stream: **Middle Fork Little Beaver Creek**	Sample Date: **08/25/1999**
River Mile: **15.00**	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 2690 sec Drain Area: 96.0 sq mi	Invalid Sample:
Purpose:	*Dist Fished:* 0.20 km Depth: 45 cm Flow: C	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Grass Pickerel		P	M	P	1	1.50	0.17	0.05	0.40	30.00
Northern Hog Sucker	R	I	S	M	32	48.00	5.32	5.23	46.30	108.97
White Sucker	W	O	S	T	42	63.00	6.99	1.10	9.69	17.38
Blacknose Dace	N	G	S	T	6	9.00	1.00	0.04	0.37	4.67
Creek Chub	N	G	N	T	28	42.00	4.66	1.26	11.15	30.00
Bluntnose Minnow	N	O	C	T	31	46.50	5.16	0.17	1.53	3.71
Central Stoneroller	N	H	N		161	241.50	26.79	1.67	14.76	6.91
Rock Bass	S	C	C		5	7.50	0.83	0.03	0.29	4.40
Largemouth Bass	F	C	C		1	1.50	0.17	0.02	0.13	10.00
Johnny Darter	D	I	C		16	24.00	2.66	0.04	0.34	1.57
Greenside Darter	D	I	S	M	54	81.00	8.99	0.15	1.33	1.85
Rainbow Darter	D	I	S	M	37	55.50	6.16	0.10	0.85	1.72
Fantail Darter	D	I	C		24	36.00	3.99	0.11	0.96	3.00
Mottled Sculpin		I	C		163	244.50	27.12	1.35	11.91	5.50
	Date Total				601	901.50		11.30		
	Number of Species				14					
	Number of Hybrids				0					

River Code: 08-200 River Mile: 15.00	Stream: **Middle Fork Little Beaver Creek** Basin: Little Beaver Creek Time Fished: 4952 sec Drain Area: 96.0 sq mi Dist Fished: 0.40 km No of Passes: 2	Sample Date: 1999 Date Range: 07/15/1999 Thru: 08/25/1999 Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Grass Pickerel		P	M	P	1	0.75	0.10	0.02	0.18	30.00
Northern Hog Sucker	R	I	S	M	59	44.25	6.15	6.65	54.27	150.26
White Sucker	W	O	S	T	71	53.25	7.40	1.83	14.92	34.33
Blacknose Dace	N	G	S	T	8	6.00	0.83	0.03	0.21	4.25
Creek Chub	N	G	N	T	38	28.50	3.96	0.78	6.40	27.50
Bluntnose Minnow	N	O	C	T	38	28.50	3.96	0.12	0.98	4.18
Central Stoneroller	N	H	N		185	138.75	19.27	1.00	8.14	7.19
Rock Bass	S	C	C		6	4.50	0.63	0.06	0.50	13.67
Largemouth Bass	F	C	C		2	1.50	0.21	0.01	0.07	5.50
Johnny Darter	D	I	C		24	18.00	2.50	0.03	0.25	1.71
Greenside Darter	D	I	S	M	84	63.00	8.75	0.13	1.03	2.00
Rainbow Darter	D	I	S	M	65	48.75	6.77	0.09	0.75	1.89
Fantail Darter	D	I	C		48	36.00	5.00	0.10	0.78	2.65
Mottled Sculpin		I	C		331	248.25	34.48	1.41	11.53	5.69
	Mile Total				960	720.00		12.25		
	Number of Species				14					
	Number of Hybrids				0					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 07/15/1999
River Mile: 4.40	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 2747 sec Drain Area: 138.0 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.22 km Depth: 45 cm Flow: C	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Gizzard Shad		O	M		3	4.09	2.94	0.67	1.90	164.33
Silver Redhorse	R	I	S	M	1	1.36	0.98	1.91	5.41	1,400.00
Black Redhorse	R	I	S	I	3	4.09	2.94	2.18	6.17	532.67
Golden Redhorse	R	I	S	M	1	1.36	0.98	0.54	1.53	396.00
Northern Hog Sucker	R	I	S	M	10	13.64	9.80	2.30	6.50	168.30
White Sucker	W	O	S	T	3	4.09	2.94	1.34	3.79	327.33
Common Carp	G	O	M	T	8	10.91	7.84	15.65	44.32	1,434.38
Silver Shiner	N	I	S	I	2	2.73	1.96	0.02	0.05	6.00
Striped Shiner	N	I	S		1	1.36	0.98	0.01	0.01	4.00
Spotfin Shiner	N	I	M		7	9.55	6.86	0.06	0.16	5.71
Bluntnose Minnow	N	O	C	T	7	9.55	6.86	0.03	0.08	2.86
Rock Bass	S	C	C		1	1.36	0.98	0.12	0.35	91.00
Smallmouth Bass	F	C	C	M	9	12.27	8.82	4.04	11.43	329.00
Green Sunfish	S	I	C	T	1	1.36	0.98	0.00	0.01	3.00
Bluegill Sunfish	S	I	C	P	2	2.73	1.96	0.03	0.08	10.50
Logperch	D	I	S	M	4	5.46	3.92	0.12	0.33	21.00
Greenside Darter	D	I	S	M	21	28.64	20.59	0.10	0.29	3.57
Banded Darter	D	I	S	I	6	8.18	5.88	0.03	0.08	3.33
Rainbow Darter	D	I	S	M	3	4.09	2.94	0.01	0.03	2.67
Freshwater Drum			M	P	8	10.91	7.84	6.15	17.42	563.63
Mottled Sculpin		I	C		1	1.36	0.98	0.02	0.07	17.00
	Date Total				102	139.09		35.31		
	Number of Species				21					
	Number of Hybrids				0					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 08/26/1999
River Mile: 4.40	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 2161 sec Drain Area: 138.0 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.22 km Depth: 70 cm Flow: C	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Skipjack Herring		P	M		1	1.36	0.27	0.01	0.02	7.00
Gizzard Shad		O	M		18	24.55	4.88	1.97	4.82	80.24
Black Redhorse	R	I	S	I	4	5.46	1.08	3.72	9.12	682.75
Golden Redhorse	R	I	S	M	11	15.00	2.98	3.83	9.38	255.27
Northern Hog Sucker	R	I	S	M	15	20.46	4.07	4.54	11.11	221.87
White Sucker	W	O	S	T	7	9.55	1.90	1.41	3.44	147.14
Common Carp	G	O	M	T	8	10.91	2.17	14.69	35.97	1,346.38
Silver Shiner	N	I	S	I	102	139.09	27.64	0.41	0.99	2.91
Rosyface Shiner	N	I	S	I	18	24.55	4.88	0.05	0.13	2.11
Striped Shiner	N	I	S		4	5.46	1.08	0.11	0.26	19.25
Spotfin Shiner	N	I	M		42	57.27	11.38	0.20	0.50	3.54
Sand Shiner	N	I	M	M	38	51.82	10.30	0.11	0.27	2.11
Mimic Shiner	N	I	M	I	2	2.73	0.54	0.01	0.02	2.50
Silverjaw Minnow	N	I	M		2	2.73	0.54	0.01	0.02	3.00
Bluntnose Minnow	N	O	C	T	16	21.82	4.34	0.06	0.15	2.88
Yellow Bullhead		I	C	T	1	1.36	0.27	0.01	0.01	4.00
Stonecat Madtom		I	C	I	2	2.73	0.54	0.19	0.46	68.50
Rock Bass	S	C	C		4	5.46	1.08	0.50	1.23	92.50
Smallmouth Bass	F	C	C	M	9	12.27	2.44	2.33	5.70	189.56
Green Sunfish	S	I	C	T	1	1.36	0.27	0.05	0.13	38.00
Bluegill Sunfish	S	I	C	P	6	8.18	1.63	0.22	0.54	26.83
Sauger	F	P	S		1	1.36	0.27	0.78	1.91	572.00
Logperch	D	I	S	M	1	1.36	0.27	0.02	0.05	16.00
Greenside Darter	D	I	S	M	22	30.00	5.96	0.07	0.18	2.41
Banded Darter	D	I	S	I	21	28.64	5.69	0.06	0.14	2.00
Rainbow Darter	D	I	S	M	4	5.46	1.08	0.01	0.03	2.00
Freshwater Drum			M	P	9	12.27	2.44	5.49	13.43	446.89
	Date Total				369	503.18		40.84		
	Number of Species				27					
	Number of Hybrids				0					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 1999
River Mile: 4.40	Basin: Little Beaver Creek	Date Range: 07/15/1999
	Time Fished: 4908 sec Drain Area: 138.0 sq mi	Thru: 08/26/1999
	Dist Fished: 0.44 km No of Passes: 2	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Skipjack Herring		P	M		1	0.68	0.21	0.01	0.01	7.00
Gizzard Shad		O	M		21	14.32	4.46	1.32	3.47	92.25
Silver Redhorse	R	I	S	M	1	0.68	0.21	0.95	2.51	1,400.00
Black Redhorse	R	I	S	I	7	4.77	1.49	2.95	7.75	618.43
Golden Redhorse	R	I	S	M	12	8.18	2.55	2.18	5.74	267.00
Northern Hog Sucker	R	I	S	M	25	17.05	5.31	3.42	8.97	200.44
White Sucker	W	O	S	T	10	6.82	2.12	1.37	3.60	201.20
Common Carp	G	O	M	T	16	10.91	3.40	15.17	39.84	1,390.38
Silver Shiner	N	I	S	I	104	70.91	22.08	0.21	0.55	2.97
Rosyface Shiner	N	I	S	I	18	12.27	3.82	0.03	0.07	2.11
Striped Shiner	N	I	S		5	3.41	1.06	0.06	0.14	16.20
Spotfin Shiner	N	I	M		49	33.41	10.40	0.13	0.34	3.85
Sand Shiner	N	I	M	M	38	25.91	8.07	0.05	0.14	2.11
Mimic Shiner	N	I	M	I	2	1.36	0.42	0.00	0.01	2.50
Silverjaw Minnow	N	I	M		2	1.36	0.42	0.00	0.01	3.00
Bluntnose Minnow	N	O	C	T	23	15.68	4.88	0.05	0.12	2.87
Yellow Bullhead		I	C	T	1	0.68	0.21	0.00	0.01	4.00
Stonecat Madtom		I	C	I	2	1.36	0.42	0.09	0.25	68.50
Rock Bass	S	C	C		5	3.41	1.06	0.31	0.82	92.20
Smallmouth Bass	F	C	C	M	18	12.27	3.82	3.18	8.36	259.28
Green Sunfish	S	I	C	T	2	1.36	0.42	0.03	0.07	20.50
Bluegill Sunfish	S	I	C	P	8	5.45	1.70	0.12	0.33	22.75
Sauger	F	P	S		1	0.68	0.21	0.39	1.02	572.00
Logperch	D	I	S	M	5	3.41	1.06	0.07	0.18	20.00
Greenside Darter	D	I	S	M	43	29.32	9.13	0.09	0.23	2.98
Banded Darter	D	I	S	I	27	18.41	5.73	0.04	0.11	2.30
Rainbow Darter	D	I	S	M	7	4.77	1.49	0.01	0.03	2.29
Freshwater Drum			M	P	17	11.59	3.61	5.82	15.28	501.82
Mottled Sculpin		I	C		1	0.68	0.21	0.01	0.03	17.00
	Mile Total				471	321.14		38.07		
	Number of Species				29					
	Number of Hybrids				0					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 07/15/1999
River Mile: 1.90	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 2127 sec Drain Area: 141.0 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.20 km Depth: 70 cm Flow: C	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Gizzard Shad		O	M		12	18.00	6.52	3.31	7.22	183.75
Silver Redhorse	R	I	S	M	1	1.50	0.54	1.29	2.81	858.00
Black Redhorse	R	I	S	I	16	24.00	8.70	11.83	25.84	492.87
Golden Redhorse	R	I	S	M	3	4.50	1.63	2.03	4.43	450.33
Northern Hog Sucker	R	I	S	M	18	27.00	9.78	8.55	18.67	316.53
White Sucker	W	O	S	T	1	1.50	0.54	0.00	0.00	1.00
Common Carp	G	O	M	T	4	6.00	2.17	13.24	28.91	2,206.25
River Chub	N	I	N	I	1	1.50	0.54	0.10	0.21	63.00
Silver Shiner	N	I	S	I	5	7.50	2.72	0.01	0.02	1.40
Rosyface Shiner	N	I	S	I	1	1.50	0.54	0.01	0.01	4.00
Striped Shiner	N	I	S		1	1.50	0.54	0.01	0.02	6.00
Spotfin Shiner	N	I	M		2	3.00	1.09	0.04	0.08	12.00
Sand Shiner	N	I	M	M	9	13.50	4.89	0.03	0.07	2.22
Bluntnose Minnow	N	O	C	T	8	12.00	4.35	0.04	0.08	3.13
Central Stoneroller	N	H	N		4	6.00	2.17	0.05	0.10	7.50
Channel Catfish	F		C		1	1.50	0.54	1.36	2.98	909.00
Yellow Bullhead		I	C	T	2	3.00	1.09	0.59	1.28	195.00
Stonecat Madtom		I	C	I	1	1.50	0.54	0.08	0.16	50.00
Rock Bass	S	C	C		1	1.50	0.54	0.08	0.17	51.00
Smallmouth Bass	F	C	C	M	1	1.50	0.54	0.50	1.09	331.00
Green Sunfish	S	I	C	T	2	3.00	1.09	0.02	0.05	8.00
Bluegill Sunfish	S	I	C	P	3	4.50	1.63	0.15	0.32	32.67
Sauger	F	P	S		1	1.50	0.54	0.50	1.10	335.00
Greenside Darter	D	I	S	M	31	46.50	16.85	0.18	0.39	3.87
Banded Darter	D	I	S	I	38	57.00	20.65	0.14	0.30	2.39
Rainbow Darter	D	I	S	M	11	16.50	5.98	0.04	0.09	2.55
Freshwater Drum			M	P	2	3.00	1.09	1.59	3.47	529.00
Mottled Sculpin		I	C		4	6.00	2.17	0.07	0.15	11.25
Date Total					184	276.00		45.79		
Number of Species					28					
Number of Hybrids					0					

Species List

River Code: **08-200**	Stream: **Middle Fork Little Beaver Creek**	Sample Date: **08/26/1999**
River Mile: **1.90**	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 2765 sec Drain Area: 141.0 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.20 km Depth: 80 cm Flow: C	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Gizzard Shad		O	M		4	6.00	1.50	0.97	2.01	162.25
Silver Redhorse	R	I	S	M	7	10.50	2.63	10.61	21.87	1,010.29
Black Redhorse	R	I	S	I	6	9.00	2.26	4.45	9.17	494.00
Golden Redhorse	R	I	S	M	3	4.50	1.13	2.95	6.09	656.00
Shorthead Redhorse	R	I	S	M	1	1.50	0.38	0.45	0.93	300.00
Northern Hog Sucker	R	I	S	M	7	10.50	2.63	2.54	5.24	242.29
White Sucker	W	O	S	T	4	6.00	1.50	1.10	2.26	182.50
Common Carp	G	O	M	T	10	15.00	3.76	16.55	34.13	1,103.60
Emerald Shiner	N	I	S		13	19.50	4.89	0.04	0.07	1.85
Silver Shiner	N	I	S	I	46	69.00	17.29	0.14	0.30	2.09
Rosyface Shiner	N	I	S	I	1	1.50	0.38	0.01	0.01	3.00
Striped Shiner	N	I	S		3	4.50	1.13	0.07	0.13	14.33
Spotfin Shiner	N	I	M		14	21.00	5.26	0.09	0.18	4.14
Bluntnose Minnow	N	O	C	T	7	10.50	2.63	0.01	0.02	1.14
Central Stoneroller	N	H	N		1	1.50	0.38	0.01	0.02	7.00
Channel Catfish	F		C		1	1.50	0.38	1.39	2.86	924.00
Yellow Bullhead		I	C	T	3	4.50	1.13	0.65	1.34	144.67
Stonecat Madtom		I	C	I	3	4.50	1.13	0.02	0.03	3.33
Rock Bass	S	C	C		3	4.50	1.13	0.25	0.51	54.33
Smallmouth Bass	F	C	C	M	7	10.50	2.63	2.42	4.99	230.24
Largemouth Bass	F	C	C		3	4.50	1.13	0.08	0.16	17.67
Green Sunfish	S	I	C	T	3	4.50	1.13	0.05	0.10	11.00
Bluegill Sunfish	S	I	C	P	7	10.50	2.63	0.25	0.51	23.71
Sauger	F	P	S		1	1.50	0.38	0.39	0.81	261.00
Greenside Darter	D	I	S	M	46	69.00	17.29	0.17	0.35	2.43
Banded Darter	D	I	S	I	43	64.50	16.17	0.11	0.22	1.67
Rainbow Darter	D	I	S	M	8	12.00	3.01	0.04	0.09	3.50
Freshwater Drum			M	P	3	4.50	1.13	2.62	5.40	582.00
Mottled Sculpin		I	C		8	12.00	3.01	0.10	0.21	8.50
	Date Total				266	399.00		48.50		
	Number of Species				29					
	Number of Hybrids				0					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 1999
River Mile: 1.90	Basin: Little Beaver Creek	Date Range: 07/15/1999
	Time Fished: 4892 sec Drain Area: 141.0 sq mi	Thru: 08/26/1999
	Dist Fished: 0.40 km No of Passes: 2	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Gizzard Shad		O	M		16	12.00	3.56	2.14	4.54	178.38
Silver Redhorse	R	I	S	M	8	6.00	1.78	5.95	12.62	991.25
Black Redhorse	R	I	S	I	22	16.50	4.89	8.14	17.26	493.18
Golden Redhorse	R	I	S	M	6	4.50	1.33	2.49	5.28	553.17
Shorthead Redhorse	R	I	S	M	1	0.75	0.22	0.23	0.48	300.00
Northern Hog Sucker	R	I	S	M	25	18.75	5.56	5.55	11.76	295.74
White Sucker	W	O	S	T	5	3.75	1.11	0.55	1.16	146.20
Common Carp	G	O	M	T	14	10.50	3.11	14.90	31.60	1,418.64
River Chub	N	I	N	I	1	0.75	0.22	0.05	0.10	63.00
Emerald Shiner	N	I	S		13	9.75	2.89	0.02	0.04	1.85
Silver Shiner	N	I	S	I	51	38.25	11.33	0.08	0.16	2.02
Rosyface Shiner	N	I	S	I	2	1.50	0.44	0.01	0.01	3.50
Striped Shiner	N	I	S		4	3.00	0.89	0.04	0.08	12.25
Spotfin Shiner	N	I	M		16	12.00	3.56	0.06	0.13	5.13
Sand Shiner	N	I	M	M	9	6.75	2.00	0.02	0.03	2.22
Bluntnose Minnow	N	O	C	T	15	11.25	3.33	0.03	0.05	2.20
Central Stoneroller	N	H	N		5	3.75	1.11	0.03	0.06	7.40
Channel Catfish	F		C		2	1.50	0.44	1.38	2.92	916.50
Yellow Bullhead		I	C	T	5	3.75	1.11	0.62	1.31	164.80
Stonecat Madtom		I	C	I	4	3.00	0.89	0.05	0.10	15.00
Rock Bass	S	C	C		4	3.00	0.89	0.16	0.34	53.50
Smallmouth Bass	F	C	C	M	8	6.00	1.78	1.46	3.09	242.83
Largemouth Bass	F	C	C		3	2.25	0.67	0.04	0.08	17.67
Green Sunfish	S	I	C	T	5	3.75	1.11	0.04	0.08	9.80
Bluegill Sunfish	S	I	C	P	10	7.50	2.22	0.20	0.42	26.40
Sauger	F	P	S		2	1.50	0.44	0.45	0.95	298.00
Greenside Darter	D	I	S	M	77	57.75	17.11	0.17	0.37	3.01
Banded Darter	D	I	S	I	81	60.75	18.00	0.12	0.26	2.01
Rainbow Darter	D	I	S	M	19	14.25	4.22	0.04	0.09	2.95
Freshwater Drum			M	P	5	3.75	1.11	2.10	4.46	560.80
Mottled Sculpin		I	C		12	9.00	2.67	0.09	0.18	9.42
	Mile Total				450	337.50		47.15		
	Number of Species				31					
	Number of Hybrids				0					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	River Segment Totals
Mile Range: 1.90	Basin: Little Beaver Creek	Date Range: 07/12/1999
Thru: 40.30	Time Fished: 66277 sec	Thru: 08/26/1999
	Dist Fished: 5.15 km No of Passes: 26	Sampler Type: D E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Skipjack Herring		P	M		1	0.05	0.01	0.00	0.00	7.00
Gizzard Shad		O	M		37	2.02	0.28	0.43	1.50	129.49
Central Mudminnow		I	C	T	7	0.45	0.06	0.00	0.01	4.25
Grass Pickerel		P	M	P	36	1.99	0.28	0.09	0.30	26.89
Silver Redhorse	R	I	S	M	9	0.51	0.07	0.86	2.98	1,036.67
Black Redhorse	R	I	S	I	29	1.64	0.23	1.39	4.79	523.41
Golden Redhorse	R	I	S	M	18	0.98	0.14	0.58	2.02	362.39
Shorthead Redhorse	R	I	S	M	1	0.06	0.01	0.03	0.10	300.00
Northern Hog Sucker	R	I	S	M	227	12.76	1.80	3.16	10.92	154.34
White Sucker	W	O	S	T	1,758	108.67	15.29	4.80	16.58	98.24
Common Carp	G	O	M	T	67	3.71	0.52	12.14	41.98	2,161.09
Golden Shiner	N	I	M	T	7	0.50	0.07			
River Chub	N	I	N	I	1	0.06	0.01	0.01	0.02	63.00
Blacknose Dace	N	G	S	T	1,043	72.82	10.25	0.06	0.19	4.06
Creek Chub	N	G	N	T	1,773	116.45	16.39	0.42	1.45	14.91
Emerald Shiner	N	I	S		13	0.75	0.11	0.00	0.01	1.85
Silver Shiner	N	I	S	I	155	8.40	1.18	0.04	0.12	2.66
Rosyface Shiner	N	I	S	I	20	1.06	0.15	0.00	0.01	2.25
Striped Shiner	N	I	S		89	4.99	0.70	0.16	0.57	23.96
Spotfin Shiner	N	I	M		65	3.49	0.49	0.02	0.08	4.16
Sand Shiner	N	I	M	M	47	2.51	0.35	0.01	0.03	2.13
Mimic Shiner	N	I	M	I	2	0.10	0.01	0.00	0.00	2.50
Silverjaw Minnow	N	I	M		17	0.97	0.14	0.00	0.01	3.50
Fathead Minnow	N	O	C	T	138	9.00	1.27	0.00	0.00	1.50
Bluntnose Minnow	N	O	C	T	1,064	72.03	10.14	0.11	0.37	3.61
Central Stoneroller	N	H	N		2,704	165.62	23.30	0.75	2.60	7.12
Channel Catfish	F		C		2	0.12	0.02	0.17	0.59	916.50
Yellow Bullhead		I	C	T	65	3.66	0.52	0.45	1.56	100.41
Brown Bullhead		I	C	T	2	0.12	0.02	0.01	0.04	55.50
Black Bullhead		I	C	P	1	0.06	0.01	0.01	0.03	100.00
Stonecat Madtom		I	C	I	6	0.34	0.05	0.02	0.06	32.83
White Crappie	S	I	C		8	0.41	0.06	0.07	0.23	105.00
Black Crappie	S	I	C		3	0.15	0.02	0.03	0.09	116.33
Rock Bass	S	C	C		60	3.22	0.45	0.38	1.30	71.81
Smallmouth Bass	F	C	C	M	26	1.41	0.20	0.58	2.01	254.22
Largemouth Bass	F	C	C		44	2.29	0.32	0.22	0.76	61.26
Green Sunfish	S	I	C	T	64	3.75	0.53	0.08	0.26	19.02
Bluegill Sunfish	S	I	C	P	115	6.21	0.87	0.28	0.97	40.82
Pumpkinseed Sunfish	S	I	C	P	56	3.30	0.46	0.06	0.21	17.76
Bluegill X Pumpkinseed					1	0.05	0.01	0.00	0.00	14.00
Green Sf X Pumpkinseed					1	0.06	0.01			
Sauger	F	P	S		3	0.17	0.02	0.10	0.36	389.33
Blackside Darter	D	I	S		1	0.05	0.01	0.00	0.00	6.00
Logperch	D	I	S	M	5	0.26	0.04	0.01	0.03	20.00

River: 08-200 Middle Fork Little Beaver Creek

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Johnny Darter	D	I	C		346	20.72	2.92	0.02	0.08	2.00
Greenside Darter	D	I	S	M	306	17.41	2.45	0.08	0.27	2.88
Banded Darter	D	I	S	I	108	6.09	0.86	0.02	0.07	2.08
Rainbow Darter	D	I	S	M	128	7.34	1.03	0.02	0.09	2.13
Fantail Darter	D	I	C		65	3.75	0.53	0.01	0.04	2.56
Freshwater Drum			M	P	22	1.18	0.17	0.99	3.42	515.23
Mottled Sculpin		I	C		550	31.69	4.46	0.25	0.88	6.15
Brook Stickleback		I	C		69	5.30	0.75			
	Stream Total				11,385	710.70		28.92		
	Number of Species				50					
	Number of Hybrids				2					

Habitat Data Sheets (QHEI)

Key QHEI Components

WWH Attributes: No Channelization or Recovered; Boulder/Cobble/Gravel Substrates; Silt Free Substrates; Good/Excellent Substrates; Moderate/High Sinuosity; Extensive/Moderate Cover; Fast Current/Eddies; Low-Normal Overall Embeddedness; Max Depth > 40 cm; Low-Normal Riffle Embeddedness; Total WWH Attributes

MWH Attributes — High Influence: Channelized or No Recovery; Silt/Muck Substrates; No Sinuosity; Sparse/No Cover; Max Depth < 40 cm (WD, HW); Total H.I. MWH Attributes

MWH Attributes — Moderate Influence: Recovering Channel; Heavy/Moderate Silt Cover; Sand Substrates (Boat); Hardpan Substrate Origin; Fair/Poor Development; Low Sinuosity; Only 1-2 Cover Types; Intermittent and Poor Pools; No Fast Current; High/Mod. Overall Embeddedness; High/Mod. Riffle Embeddedness; No Riffle; Total M.I. MWH Attributes

(08-200) Middle Fork Little Beaver Creek

Year: 99

River Mile	QHEI	Gradient (ft/mile)	Total WWH Attributes	Total H.I. MWH Attributes	Total M.I. MWH Attributes	(MWH H.I.+1)/(WWH+1) Ratio	(MWH M.I.+1)/(WWH+1) Ratio
40.3	55.5	30.30	5	2	6	0.50	1.50
38.2	46.0	10.75	3	3	6	1.00	2.50
37.7	67.5	11.76	6	2	6	0.43	1.29
36.7	60.5	13.89	4	2	6	0.60	1.80
33.3	84.0	18.18	8	0	3	0.11	0.44
32.0	64.0	6.25	7	1	4	0.25	0.75
28.8	50.0	3.74	2	2	8	1.00	3.67
25.8	49.0	4.93	1	2	7	1.50	5.00
23.5	59.5	5.21	4	2	6	0.60	1.80
21.8	67.5	3.76	6	0	5	0.14	0.86
20.9	48.0	3.76	1	2	6	1.50	4.50
15.0	83.5	7.84	8	0	3	0.11	0.44
10.9	67.0	8.16	5	1	6	0.33	1.33
9.9	75.0	8.16	7	0	5	0.13	0.75
9.0	71.0	8.16	5	0	6	0.17	1.17
8.4	71.0	5.78	5	0	7	0.17	1.33
4.4	76.5	11.76	6	0	5	0.14	0.86
1.9	77.5	10.50	8	0	4	0.11	0.56

Ohio EPA Qualitative Habitat Evaluation Index Field Sheet QHEI Score: ____

River Code: 08200 RM: 1.9 Stream M. F. L. BEAVER CR.
Date 07/15/99 Location BEAR HOLLOW RD.
Scorers Initials: DJA Comments REFERENCE SITE LAT/LONG: 40 44 08/80 38 32

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Estimate % present*);

TYPE	POOL	RIFFLE
☐ ☐-BLDR /SLBS[10]		✓
☐ ☐-BOULDER [9]		✓
☒ ☐-COBBLE [8]		✓
☐ ☐-HARDPAN [4]		
☐ ☐-MUCK [2]		
☐ ☐-SILT [2]		✓
☒ ☐-GRAVEL [7]		✓
☐ ☐-SAND [6]		✓
☐ ☐-BEDROCK[5]		✓
☐ ☐-DETRITUS[3]		✓
☐ ☐-ARTIFICIAL[0]		

NOTE: (Ignore sludge originating from point-sources; score on natural substrates) ☒ 5 or More [2]
NUMBER OF SUBSTRATE TYPES: ☐ 4 or Less [0]

SUBSTRATE ORIGIN (Check ONE (OR 2 & AVERAGE)):
☐ -LIMESTONE [1]
☒ -TILLS [1]
☐ -WETLANDS[0]
☐ -HARDPAN [0]
☒ -SANDSTONE [0]
☐ -RIP/RAP [0]
☐ -LACUSTRINE [0]
☐ -SHALE [-1]
☐ -COAL FINES [-2]

SILT:
EMBEDDEDNESS:

SUBSTRATE QUALITY (Check ONE (OR 2 & AVERAGE)):
☐ -SILT HEAVY [-2]
☒ -SILT MODERATE [-1]
☐ -SILT NORMAL [0]
☐ -SILT FREE [1]
☐ -EXTENSIVE [-2]
☒ -MODERATE [-1]
☐ -NORMAL [0]
☐ -NONE [1]

Substrate ____ Max 20

COMMENTS: SILT COVERING EVERYTHING

2] INSTREAM COVER (see back for instructions for additional cover scoring method)

TYPE: (Check *All* That Apply)
☐ ___ UNDERCUT BANKS [1]
☐ ___ OVERHANGING VEGETATION [1]
☒ 1 SHALLOWS (IN SLOW WATER) [1]
☐ ___ ROOTMATS [1]
☒ 2 POOLS> 70 cm [2]
☐ ___ ROOTWADS [1]
☒ 2 BOULDERS [1]
☐ ___ OXBOWS, BACKWATERS [1]
☒ 1 AQUATIC MACROPHYTES [1]
☒ 1 LOGS OR WOODY DEBRIS [1]

COMMENTS: ____

AMOUNT: (Check *ONLY* One or check 2 and *AVERAGE*)
☐ - EXTENSIVE > 75% [11]
☒ - MODERATE 25-75% [7]
☐ - SPARSE 5-25% [3]
☐ - NEARLY ABSENT < 5%[1]

Cover ____ Max 20

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐ - HIGH [4]	☐ - EXCELLENT [7]	☒ - NONE [6]	☒ - HIGH [3]	☐ - SNAGGING	☐ - IMPOUND.
☒ - MODERATE [3]	☒ - GOOD [5]	☐ - RECOVERED [4]	☒ - MODERATE [2]	☐ - RELOCATION	☐ - ISLANDS
☒ - LOW [2]	☐ - FAIR [3]	☐ - RECOVERING [3]	☐ - LOW [1]	☐ - CANOPY REMOVAL	☐ - LEVEED
☐ - NONE [1]	☐ - POOR [1]	☐ - RECENT OR NO RECOVERY [1]		☐ - DREDGING	☐ - BANK SHAPING
				☐ - ONE SIDE CHANNEL MODIFICATIONS	

Channel ____ Max 20

COMMENTS: ____

4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH L R (Per Bank)	FLOOD PLAIN QUALITY (*PAST 100 Meter RIPARIAN*) L R (Most Predominant Per Bank)		BANK EROSION L R (Per Bank)
☐ ☐ - WIDE > 50m [4]	☒ ☒-FOREST, SWAMP [3]	☐ ☐-CONSERVATION TILLAGE [1]	☒ ☐-NONE/LITTLE [3]
☐ ☒ - MODERATE 10-50m [3]	☐ ☐-SHRUB OR OLD FIELD [2]	☐ ☐ -URBAN OR INDUSTRIAL [0]	☐ ☐ -MODERATE [2]
☒ ☒ -NARROW 5-10 m [2]	☒ ☒-RESIDENTIAL,PARK,NEW FIELD [1]	☐ ☐ -OPEN PASTURE,ROWCROP [0]	☐ ☐ -HEAVY/SEVERE[1]
☐ ☐ - VERY NARROW <5 m[1]	☐ ☐ -FENCED PASTURE [1]	☐ ☐ -MINING/CONSTRUCTION [0]	
☐ ☐ - NONE [0]			

Riparian ____ Max 10

COMMENTS: ____

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 *ONLY!*)
☒ - >1m [6]
☐ - 0.7-1m [4]
☐ - 0.4-0.7m [2]
☐ - 0.2- 0.4m [1]
☐ - < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE)
☒ -POOL WIDTH > RIFFLE WIDTH [2]
☐ -POOL WIDTH = RIFFLE WIDTH [1]
☐ -POOL WIDTH< RIFFLE W. [0]

CURRENT VELOCITY [POOLS & RIFFLES!] (Check *All* That Apply)
☐ -EDDIES[1]
☒ -FAST[1]
☒ -MODERATE [1]
☒ -SLOW [1]
☐ -TORRENTIAL[-1]
☐ -INTERSTITIAL[-1]
☐ -INTERMITTENT[-2]

Pool/ Current ____ Max 12

COMMENTS: ____

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE DEPTH	RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
☒ -*Best Areas >10 cm [2]	☒ - MAX > 50 [2]	☒-STABLE (e.g.,Cobble, Boulder) [2]	☐ - NONE [2]
☐ - Best Areas 5-10 cm[1]	☐ - MAX < 50[1]	☐-MOD. STABLE (e.g.,Large Gravel) [1]	☒ - LOW [1]
☐ - Best Areas < 5 cm [RIFFLE=0]		☐-UNSTABLE (Fine Gravel,Sand) [0]	☒ - MODERATE [0]
			☐ - EXTENSIVE [-1]

☐ - NO RIFFLE [Metric=0]

Riffle/Run ____ Max 8

Gradient ____ Max 10

COMMENTS: ____

6] GRADIENT (ft/mi): 10.50 DRAINAGE AREA (sq.mi.): 141 %POOL: 85 %GLIDE: ____ %RIFFLE: 15 %RUN: 10

*Best areas must be large enough to support a population of riffle-obligate fish species.

Is Sampling Reach Representative of the Stream (Y/N) Y If Not, Explain:

EXTENSIVE SILT BEDS IN NON-CURRENT POOL AREAS - SOME 6" DEEP

Major Suspected Sources of Impacts (Check All That Apply):

- None ☐
- Industrial ☐
- WWTP ☐
- Ag ☐
- Livestock ☐
- Silviculture ☐
- Construction ☐
- Urban Runoff ☐
- CSOs ☐
- Suburban Impacts ☐
- Mining ☒
- Channelization ☐
- Riparian Removal ☐
- Landfills ☐
- Natural ☐
- Dams ☐
- Other Flow Alteration ☐
- Other: ☐

UNT. SAND GRAVEL

	Gear:	Distance:	Water Clarity:	Water Stage:	Canopy -% Open
First Sampling Pass	D	0.20	>100	LOW	20

Subjective Rating (1-10) ☐

Aesthetic Rating (1-10) ☐

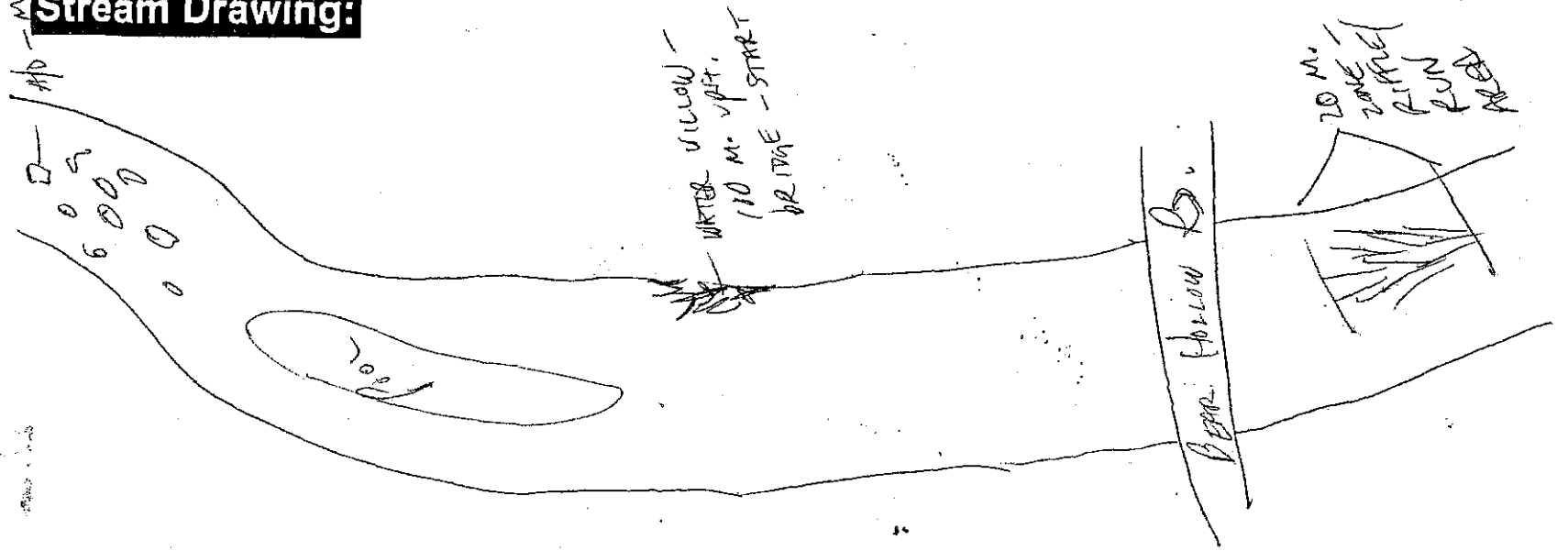
Gradient: ☐ - Low, ☐ - Moderate, ☐ -High

Stream Measurements:

Average Width	Average Depth	Maximum Depth	Av. Bankfull Width	Bankfull Mean Depth	W/D Ratio	Bankfull Max Depth	Floodprone Area Width	Entrench Ratio
23 M	70CM	>120CM						

180 M

Stream Drawing:



Yes	No	
☐	☒	Is Stream Ephemeral (No pools totally dry or only damp spots)?
☐	☐	Is There Water Upstream? How Far: ____
☐	☐	Is There Water Close Downstream? How Far: ____
☐	☐	Is Dry Channel Mostly Natural?

Instructions for Scoring the Alternate Cover Metric: Each Cover Type Should Receive a Score of Between 0 and 3, Where: 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

OhioEPA Qualitative Habitat Evaluation Index Field Sheet QHEI Score: ____

River Code: 08-200 RM: 4.9 Stream M. F. L. BEAVER CR.
Date 07/15/99 Location LUSK LOCK AREA – BEAVER STATE PARK
Scorers Initials: DJA Comments LAT/LONG: 40 44 15/80 39 59

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Estimate % present*);

TYPE	POOL	RIFFLE
☐ ☐-BLDR /SLBS[10]	✓	
☐ ☐-BOULDER [9]	✓	
☒ ☐-COBBLE [8]		✓
☐ ☐-HARDPAN [4]		
☐ ☐-MUCK [2]		
☐ ☐-SILT [2]	✓	
☒ ☐-GRAVEL [7]		✓
☐ ☐-SAND [6]		✓
☐ ☐-BEDROCK[5]		
☐ ☐-DETRITUS[3]		✓
☐ ☐-ARTIFICIAL[0]		

NOTE: (Ignore sludge originating from point-sources; score on natural substrates)
NUMBER OF SUBSTRATE TYPES: ☒-5 or More [2] ☐-4 or Less [0]

SUBSTRATE ORIGIN (Check ONE (OR 2 & AVERAGE)): ☐ -LIMESTONE [1] ☒ -TILLS [1] ☐ -WETLANDS[0] ☐ -HARDPAN [0] ☒ -SANDSTONE [0] ☐ -RIP/RAP [0] ☐ -LACUSTRINE [0] ☐ -SHALE [-1] ☐ -COAL FINES [-2]

SUBSTRATE QUALITY (Check ONE (OR 2 & AVERAGE))
SILT: ☒ -SILT HEAVY [-2] ☒ -SILT MODERATE [-1] ☐ -SILT NORMAL [0] ☐ -SILT FREE [1]
EMBEDDEDNESS: ☒ -EXTENSIVE [-2] ☒ -MODERATE [-1] ☐ -NORMAL [0] ☐ -NONE [1]

Substrate ____ Max 20

COMMENTS:

2] INSTREAM COVER (see back for instructions for additional cover scoring method)

TYPE: (Check *All* That Apply)
☐ ___UNDERCUT BANKS [1] ☒ 2 POOLS> 70 cm [2] ☐ ___OXBOWS, BACKWATERS [1]
☐ ___OVERHANGING VEGETATION [1] ☐ ___ROOTWADS [1] ☐ ___AQUATIC MACROPHYTES [1]
☒ 2 SHALLOWS (IN SLOW WATER) [1] ☒ 2 BOULDERS [1] ☒ 1 LOGS OR WOODY DEBRIS [1]
☐ ___ROOTMATS [1] COMMENTS:

AMOUNT: (Check *ONLY* One or check 2 and *AVERAGE*)
☐ - EXTENSIVE > 75% [11] ☒ - MODERATE 25-75% [7] ☐ - SPARSE 5-25% [3] ☐ - NEARLY ABSENT < 5%[1]

Cover ____ Max 20

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ - HIGH [4]	☐ - EXCELLENT [7]	☒ - NONE [6]	☒ - HIGH [3]
☒ - MODERATE [3]	☒ - GOOD [5]	☐ - RECOVERED [4]	☐ - MODERATE [2]
☒ - LOW [2]	☐ - FAIR [3]	☐ - RECOVERING [3]	☐ - LOW [1]
☐ - NONE [1]	☐ - POOR [1]	☐ - RECENT OR NO RECOVERY [1]	

MODIFICATIONS/OTHER: ☐ - SNAGGING ☐ - IMPOUND. ☐ - RELOCATION ☐ - ISLANDS ☐ - CANOPY REMOVAL ☐ - LEVEED ☐ - DREDGING ☐ - BANK SHAPING ☐ - ONE SIDE CHANNEL MODIFICATIONS

Channel ____ Max 20

COMMENTS:

4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH L R (Per Bank)	FLOOD PLAIN QUALITY (*PAST 100 Meter RIPARIAN*) L R (Most Predominant Per Bank)		BANK EROSION L R (Per Bank)
☒ ☒ -WIDE > 50m [4]	☒ ☒ -FOREST, SWAMP [3]	☐ ☐ -CONSERVATION TILLAGE [1]	☒ ☒ -NONE/LITTLE [3]
☐ ☐ - MODERATE 10-50m [3]	☐ ☐ -SHRUB OR OLD FIELD [2]	☐ ☐ -URBAN OR INDUSTRIAL [0]	☐ ☐ -MODERATE [2]
☐ ☐ -NARROW 5-10 m [2]	☐ ☐ -RESIDENTIAL,PARK,NEW FIELD [1]	☐ ☐ -OPEN PASTURE,ROWCROP [0]	☐ ☐ -HEAVY/SEVERE[1]
☐ ☐ - VERY NARROW <5 m[1]	☐ ☐ -FENCED PASTURE [1]	☐ ☐ -MINING/CONSTRUCTION [0]	
☐ ☐ - NONE [0]			

Riparian ____ Max 10

COMMENTS:

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)
☒ - >1m [6]
☐ - 0.7-1m [4]
☐ - 0.4-0.7m [2]
☐ - 0.2- 0.4m [1]
☐ - < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE)
☒ -POOL WIDTH > RIFFLE WIDTH [2]
☒ -POOL WIDTH = RIFFLE WIDTH [1]
☐ -POOL WIDTH< RIFFLE W. [0]

CURRENT VELOCITY [POOLS & RIFFLES!] (Check *All* That Apply)
☐ -EDDIES[1] ☐ -TORRENTIAL[-1]
☐ -FAST[1] ☐ -INTERSTITIAL[-1]
☒ -MODERATE [1] ☐ -INTERMITTENT[-2]
☒ -SLOW [1]

Pool/ Current ____ Max 12

COMMENTS:

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE DEPTH
☒ - Best Areas >10 cm [2]
☐ - Best Areas 5-10 cm[1]
☐ - Best Areas < 5 cm [RIFFLE=0]

RUN DEPTH
☒ - MAX > 50 [2]
☐ - MAX < 50[1]

RIFFLE/RUN SUBSTRATE
☐ -STABLE (e.g.,Cobble, Boulder) [2]
☐ -MOD. STABLE (e.g.,Large Gravel) [1]
☐ -UNSTABLE (Fine Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
☐ - NONE [2]
☐ - LOW [1]
☒ - MODERATE [0]
☐ - EXTENSIVE [-1]

☐ - NO RIFFLE [Metric=0]

Riffle/Run ____ Max 8
Gradient ____ Max 10

COMMENTS:

6] GRADIENT (ft/mi): 11.76 DRAINAGE AREA (sq.mi.): 138

%POOL: 60 %GLIDE: 10
%RIFFLE: 10 %RUN: 20

*Best areas must be large enough to support a population of riffle-obligate fish species.

Is Sampling Reach Representative of the Stream (Y/N) Y If Not, Explain: _____

Major Suspected Sources of Impacts (Check All That Apply):
None ☐
Industrial ☐
WWTP ☐
Ag ☐
Livestock ☐
Silviculture ☐
Construction ☐
Urban Runoff ☐
CSOs ☐
Suburban Impacts ☐
Mining ☒
Channelization ☐
Riparian Removal ☐
Landfills ☐
Natural ☐
Dams ☐
Other Flow Alteration ☐
Other: _____ ☐
SAND & GRAVEL MST

	Gear:	Distance:	Water Clarity:	Water Stage:	Canopy -% Open
First Sampling Pass	D	0,22	7100	LOW	10

Subjective Rating (1-10) ☐

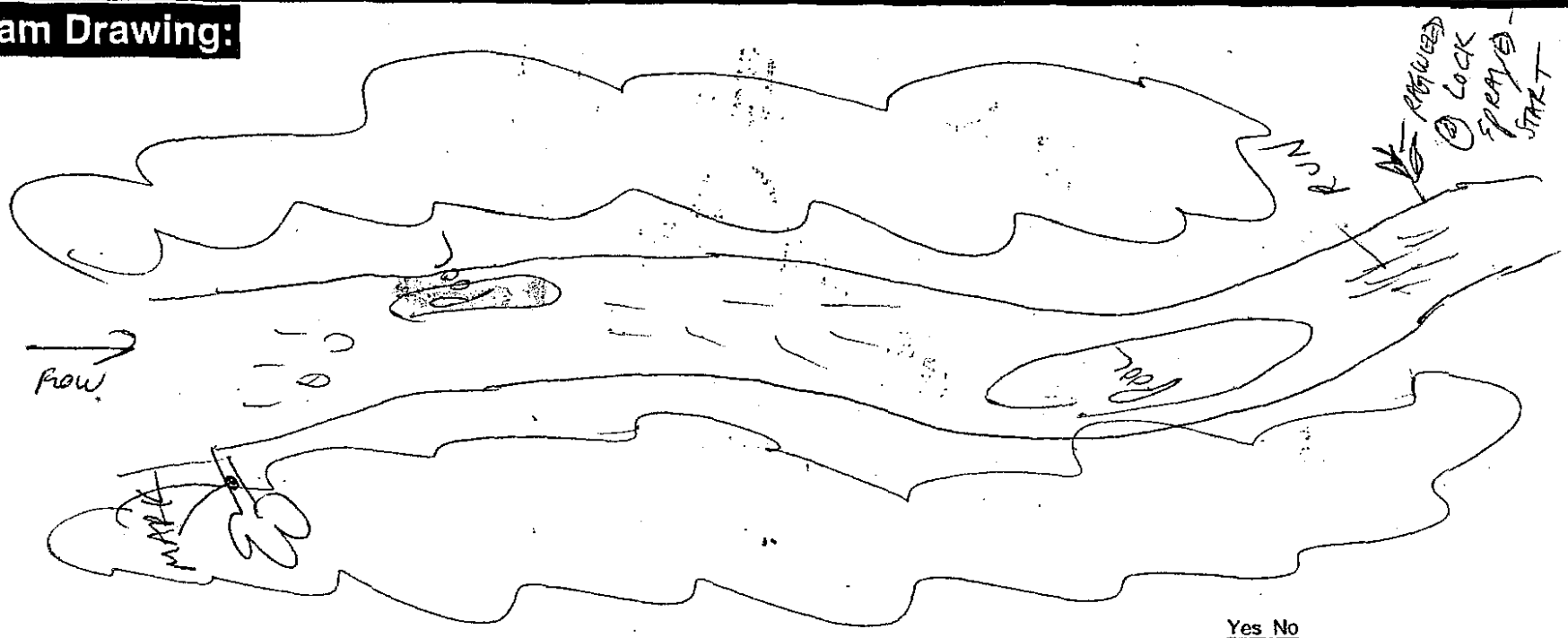
Aesthetic Rating (1-10) ☐

Gradient: ☐ - Low, ☐ - Moderate, ☐ -High

Stream Measurements:

Average Width	Average Depth	Maximum Depth	Av. Bankfull Width	Bankfull Mean Depth	W/D Ratio	Bankfull Max Depth	Floodprone Area Width	Entrench. Ratio
20M	45 CM	120CM						

Stream Drawing:



Yes	No	
☐	☒	*Is Stream Ephemeral* (No pools, totally dry or only damp spots)?
☐	☐	Is There Water Upstream? How Far: _____
☐	☐	Is There Water Close Downstream? How Far: _____
☐	☐	Is Dry Channel Mostly Natural?

Instructions for Scoring the Alternate Cover Metric: Each Cover Type Should Receive a Score of Between 0 and 3, Where: 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

Qualitative Habitat Evaluation Index Field Sheet

River Code: 08 RM: 8.4 Stream: Middle Fork Little Beaver Creek
Date: 7/28/09 Location: dst Elkton WWTP - coll SR ISY
Scorers Initials: SETR Comments:

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Estimate % present*);

TYPE	POOL	RIFFLE
☐ ☐-BLDR /SLBS[10]	___	___
☐ ☐-BOULDER [9]	___	___
☒ ☐-COBBLE [8]	___	___
☐ ☐-HARDPAN [4]	___	___
☐ ☐-MUCK [2]	___	___
☐ ☐-SILT [2]	___	___

	POOL	RIFFLE
☐ ☐-GRAVEL [7]	___	___
☐ ☐-SAND [6]	___	___
☐ ☐-BEDROCK[5]	___	___
☐ ☐-DETRITUS[3]	___	___
☐ ☐-ARTIFICIAL[0]	___	___

NOTE : (Ignore sludge originating from point-sources; score on natural substrates)

NUMBER OF SUBSTRATE TYPES: ☐-5 or More [2] ☐-4 or Less [0]

SUBSTRATE ORIGIN — Check ONE (OR 2 & AVERAGE)
☐-LIMESTONE [1]
☐-TILLS [1]
☐-WETLANDS[0]
☐-HARDPAN [0]
☐-SANDSTONE [0]
☐-RIP/RAP [0]
☐-LACUSTRINE [0]
☐-SHALE [-1]
☐-COAL FINES [-2]

SILT:
EMBEDDEDNESS:

SUBSTRATE QUALITY — Check ONE (OR 2 & AVERAGE
☐-SILT HEAVY [-2]
☐-SILT MODERATE [-1]
☐-SILT NORMAL [0]
☐-SILT FREE [1]
☐-EXTENSIVE [-2]
☐-MODERATE [-1]
☐-NORMAL [0]
☐-NONE [1]

Substrate ☐ Max 20

COMMENTS:

2] INSTREAM COVER

TYPE: (Check *All* That Apply)
☐-UNDERCUT BANKS [1]
☐-OVERHANGING VEGETATION [1]
☐-SHALLOWS (IN SLOW WATER) [1]
☐-ROOTMATS[1]
☐-POOLS> 70 cm [2]
☐-ROOTWADS [1]
☐-BOULDERS[1]
☐-OXBOWS, BACKWATERS [1]
☐-AQUATIC MACROPHYTES [1]
☐-LOGS OR WOODY DEBRIS[1]

AMOUNT: (Check *ONLY* One or check 2 and *AVERAGE*)
☐ - EXTENSIVE > 75% [11]
☐ - MODERATE 25-75% [7]
☐ - SPARSE 5-25% [3]
☐ - NEARLY ABSENT < 5% [1]

Cover ☐ Max 20

COMMENTS:

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY
☐-HIGH [4]
☐-MODERATE [3]
☐-LOW [2]
☐-NONE [1]

DEVELOPMENT
☐ - EXCELLENT [7]
☐-GOOD [5]
☐-FAIR [3]
☐-POOR [1]

CHANNELIZATION
☐-NONE[6]
☐ - RECOVERED [4]
☐-RECOVERING [3]
☐-RECENT OR NO RECOVERY [1]

STABILITY
☐-HIGH [3]
☐-MODERATE [2]
☐-LOW [1]

MODIFICATIONS/OTHER
☐-SNAGGING ☐-IMPOUND.
☐-RELOCATION ☐-ISLANDS
☐-CANOPY REMOVAL ☐-LEVEED
☐-DREDGING ☐-BANK SHAPING
☐-ONE SIDE CHANNEL MODIFICATIONS

Channel ☐ Max 20

COMMENTS:

4]. RIPARIAN ZONE AND BANK EROSION (check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstrea

RIPARIAN WIDTH (L R Per Bank)
☐ ☐ - WIDE > 50m [4]
☐ ☐-MODERATE 10-50m [3]
☐ ☐-NARROW 5-10m [2]
☐ ☐ - VERY NARROW < 5m [1]
☐ ☐ - NONE [0]

FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN) (L R Most Predominant Per Bank)
☐ ☐-FOREST, SWAMP [3]
☐ ☐-SHRUB OR OLD FIELD [2]
☐ ☐-RESIDENTIAL, PARK, NEW FIELD [1]
☐ ☐-FENCED PASTURE [1]
☐ ☐-CONSERVATION TILLAGE [1]
☐ ☐-URBAN OR INDUSTRIAL [0]
☐ ☐-OPEN PASTURE, ROWCROP [0]
☐ ☐-MINING/CONSTRUCTION [0]

BANK EROSION (L R Per Bank)
☐ ☐-NONE/LITTLE[3]
☐ ☐-MODERATE[2]
☐ ☐-HEAVY/SEVERE[1]

Riparian ☐ Max 10

COMMENTS:

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)
☐ > 1m [6]
☐ - 0.7-1m [4]
☐ - 0.4-0.7m [2]
☐ - 0.2-0.4m [1]
☐ - < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE)
☐ - POOL WIDTH > RIFFLE WIDTH [2]
☐ - POOL WIDTH = RIFFLE WIDTH [1]
☐ - POOL WIDTH < RIFFLE W. [0]

CURRENT VELOCITY (POOLS & RIFFLES!) (Check *All* That Apply)
☐ - EDDIES [1]
☐ - FAST [1]
☐ - MODERATE [1]
☐ - SLOW [1]
☐ - TORRENTIAL [-1]
☐ - INTERSTITIAL [-1]
☐ - INTERMITTENT [-2]

Pool/Current ☐ Max 12

COMMENTS:

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE/RUN DEPTH
☐ - Generally > 10 cm, MAX > 50 [4]
☐ - Generally > 10 cm, MAX < 50 [3]
☐ - Generally 5-10 cm [1]
☐ - Generally < 5 cm [RIFFLE=0]

RIFFLE/RUN SUBSTRATE
☐-STABLE (e.g., Cobble, Boulder) [2]
☐-MOD. STABLE (e.g., Large Gravel) [1]
☐-UNSTABLE (Fine Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
☐ - NONE [2]
☐ - LOW [1]
☐ - MODERATE [0]
☐ - EXTENSIVE [-1]

Riffle/Run ☐ Max 8

☐ - NO RIFFLE [Metric=0]

Gradient ☐ Max 10

COMMENTS:

GRADIENT (ft/mi): 5.78 DRAINAGE AREA (sq.mi.): 125

%POOL: ___ %GLIDE: ___
%RIFFLE: ___ %RUN: ___

Sampling Reach Representative of Stream? (Y/N) Y If Not, Explain: 6x similar to val. station – modified & high recovery

Unusual Conditions/Pollution Impacts: _____

Major Suspected Impacts (✓ All That Apply)

- None
- Industrial
- WWTP
- Ag
- Livestock
- Silviculture
- Construction
- Urban Runoff
- CSOs
- Suburban Impacts
- Mining
- Channelization
- Riparian Removal
- Landfills
- Natural
- Flow Alteration
- Other: _____

First Sampling Pass: Gear D | Distance 200 | Water Clarity _____ | Water Stage Normal | CANOPY (% OPEN) 50%

Objective Rating (1-10): 7 | Aesthetic Rating (1-10): 6

Ohio EPA

STREAM MEASUREMENTS:

AVERAGE WIDTH: _____

AVERAGE DEPTH: _____

MAXIMUM DEPTH: _____

GRADIENT:

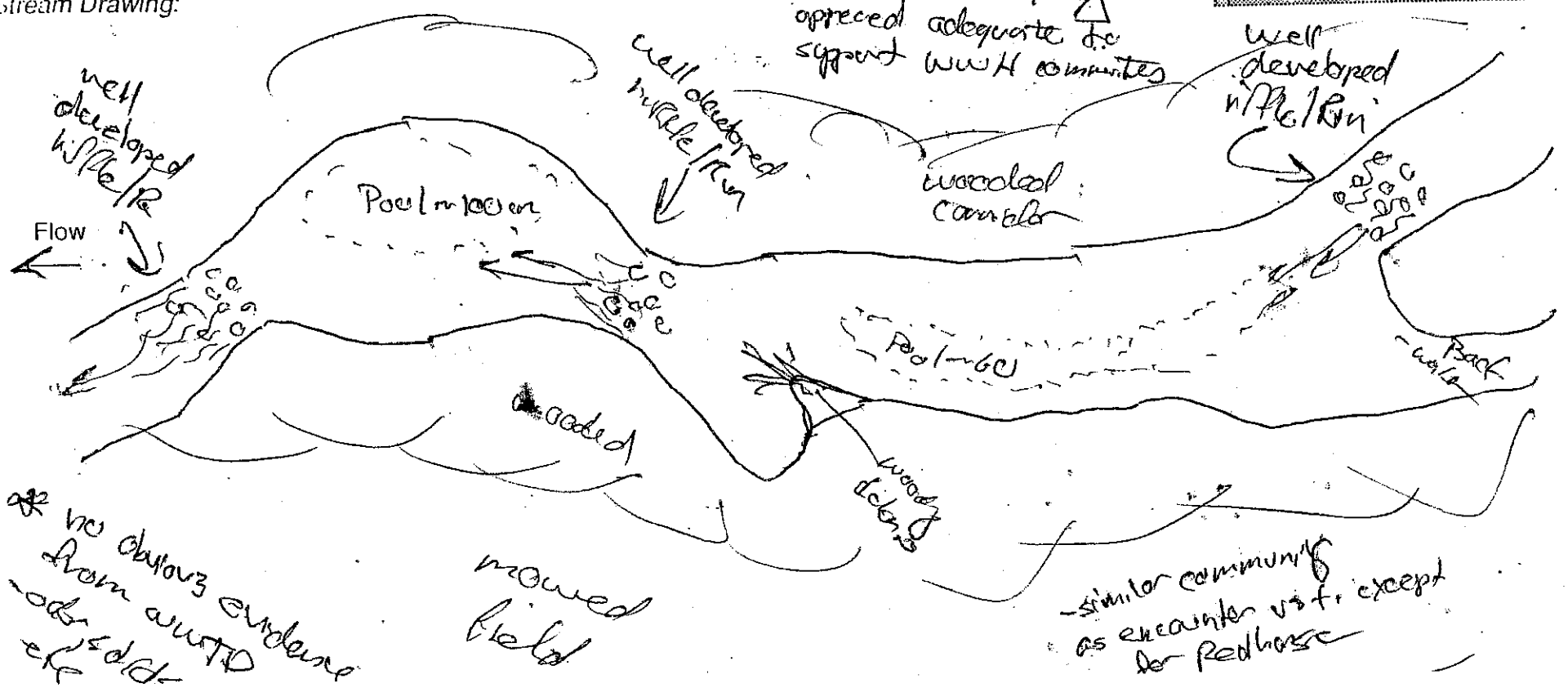
- LOW
- MODERATE
- HIGH

Rosgen Stream Classification Information:

Average Bankfull Width:	Bankfull Mean Depth:	Bankfull Maximum Depth:	Floodprone Area Width:
C:	A:	B	D:

Width/Depth Ratio: _____ Entrenchment Ratio: _____

Stream Drawing:



OhioEPA Qualitative Habitat Evaluation Index Field Sheet QHEI Score: ____

River Code: 08 RM: 9.0 Stream: Middle Fork Little Beaver
Date: 7/28/99 Location: Dower Rd. (ust. Elkton WWTP
Scorers Initials: CETS Comments: ____

] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Estimate % present*);

TYPE	POOL	RIFFLE
☐ -BLDR /SLBS[10]	___	___
☐ -BOULDER [9]	X	X
☐ -COBBLE [8]	X	X
☐ -HARDPAN [4]	___	___
☐ -MUCK [2]	___	___
☐ -SILT [2]	X	___

	POOL	RIFFLE
☐ -GRAVEL [7]	X	X
☐ -SAND [6]	X	X
☐ -BEDROCK[5]	___	___
☐ -DETRITUS[3]	___	___
☐ -ARTIFICIAL[0]	___	___

SUBSTRATE ORIGIN — Check ONE (OR 2 & AVERAGE)
- ☐ -LIMESTONE [1]
- ☐ -TILLS [1]
- ☐ -WETLANDS[0]
- ☐ -HARDPAN [0]
- ☐ -SANDSTONE [0]
- ☐ -RIP/RAP [0]
- ☐ -LACUSTRINE [0]
- ☐ -SHALE [-1]
- ☐ -COAL FINES [-2]

SUBSTRATE QUALITY — Check ONE (OR 2 & AVERAGE)

SILT:
- ☐ -SILT HEAVY [-2]
- ☐ -SILT MODERATE [-1]
- ☐ -SILT NORMAL [0]
- ☐ -SILT FREE [1]

EMBEDDEDNESS:
- ☐ -EXTENSIVE [-2]
- ☐ -MODERATE [-1]
- ☐ -NORMAL [0]
- ☐ -NONE [1]

Substrate: ____ Max 20

NOTE : (Ignore sludge originating from point sources; score on natural substrates)

NUMBER OF SUBSTRATE TYPES: ☐ -5 or More [2] ☐ -4 or Less [0]

COMMENTS: ____

2] INSTREAM COVER

TYPE: (Check *All* That Apply)
- ☐ -UNDERCUT BANKS [1]
- ☐ -OVERHANGING VEGETATION [1]
- ☐ -SHALLOWS (IN SLOW WATER) [1]
- ☐ -ROOTMATS [1]
- ☐ -POOLS > 70 cm [2]
- ☐ -ROOTWADS [1]
- ☐ -BOULDERS [1]
- ☐ -OXBOWS, BACKWATERS [1]
- ☐ -AQUATIC MACROPHYTES [1]
- ☐ -LOGS OR WOODY DEBRIS [1]

COMMENTS: ____

AMOUNT: (Check *ONLY* One or check 2 and *AVERAGE*)
- ☐ -EXTENSIVE > 75% [11]
- ☐ -MODERATE 25-75% [7]
- ☐ -SPARSE 5-25% [3]
- ☐ -NEARLY ABSENT < 5% [1]

Cover: ____ Max 20

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ -HIGH [4]	☐ -EXCELLENT [7]	☐ -NONE [6]	☐ -HIGH [3]
☐ -MODERATE [3]	☐ -GOOD [5]	☐ -RECOVERED [4]	☐ -MODERATE [2]
☐ -LOW [2]	☐ -FAIR [3]	☐ -RECOVERING [3]	☐ -LOW [1]
☐ -NONE [1]	☐ -POOR [1]	☐ -RECENT OR NO RECOVERY [1]	

MODIFICATIONS/OTHER
- ☐ -SNAGGING
- ☐ -RELOCATION
- ☐ -CANOPY REMOVAL
- ☐ -DREDGING
- ☐ -ONE SIDE CHANNEL MODIFICATIONS
- ☐ -IMPOUND.
- ☐ -ISLANDS
- ☐ -LEVEED
- ☐ -BANK SHAPING

Channel: ____ Max 20

COMMENTS: ____

4]. RIPARIAN ZONE AND BANK EROSION (check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstrea

RIPARIAN WIDTH (Per Bank) — L R
- ☐ ☐ -WIDE > 50m [4]
- ☐ ☐ -MODERATE 10-50m [3]
- ☐ ☐ -NARROW 5-10m [2]
- ☐ ☐ -VERY NARROW < 5m [1]
- ☐ ☐ -NONE [0]

FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN) (Most Predominant Per Bank) — L R
- ☐ ☐ -FOREST, SWAMP [3]
- ☐ ☐ -SHRUB OR OLD FIELD [2]
- ☐ ☐ -RESIDENTIAL, PARK, NEW FIELD [1]
- ☐ ☐ -FENCED PASTURE [1]
- ☐ ☐ -CONSERVATION TILLAGE [1]
- ☐ ☐ -URBAN OR INDUSTRIAL [0]
- ☐ ☐ -OPEN PASTURE, ROWCROP [0]
- ☐ ☐ -MINING/CONSTRUCTION [0]

BANK EROSION (Per Bank) — L R
- ☐ ☐ -NONE/LITTLE [3]
- ☐ ☐ -MODERATE [2]
- ☐ ☐ -HEAVY/SEVERE [1]

Riparian: ____ Max 10

COMMENTS: ____

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)
- ☐ - > 1m [6]
- ☐ - 0.7-1m [4]
- ☐ - 0.4-0.7m [2]
- ☐ - 0.2-0.4m [1]
- ☐ - < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE)
- ☐ -POOL WIDTH > RIFFLE WIDTH [2]
- ☐ -POOL WIDTH = RIFFLE WIDTH [1]
- ☐ -POOL WIDTH < RIFFLE W. [0]

CURRENT VELOCITY (POOLS & RIFFLES!) (Check *All* That Apply)
- ☐ -EDDIES [1]
- ☐ -FAST [1]
- ☐ -MODERATE [1]
- ☐ -SLOW [1]
- ☐ -TORRENTIAL [-1]
- ☐ -INTERSTITIAL [-1]
- ☐ -INTERMITTENT [-2]

Pool/Current: ____ Max 12

COMMENTS: ____

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE/RUN DEPTH
- ☐ - Generally > 10 cm, MAX > 50 [4]
- ☐ - Generally > 10 cm, MAX < 50 [3]
- ☐ - Generally 5-10 cm [1]
- ☐ - Generally < 5 cm [RIFFLE=0]

RIFFLE/RUN SUBSTRATE
- ☐ -STABLE (e.g., Cobble, Boulder) [2]
- ☐ -MOD. STABLE (e.g., Large Gravel) [1]
- ☐ -UNSTABLE (Fine Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
- ☐ - NONE [2]
- ☐ - LOW [1]
- ☐ - MODERATE [0]
- ☐ - EXTENSIVE [-1]

Riffle/Ru: ____ Max 8

Gradient: ____ Max 10

COMMENTS: ____

☐ - NO RIFFLE [Metric=0]

GRADIENT (ft/mi): 8.16 DRAINAGE AREA (sq.mi.): 114

%POOL: ____ %GLIDE: ____
%RIFFLE: ____ %RUN: ____

7/24/97

Sampling Reach Representative of Stream? (Y/N) Y If Not, Explain: _____

Unusual Conditions/Pollution Impacts: _____

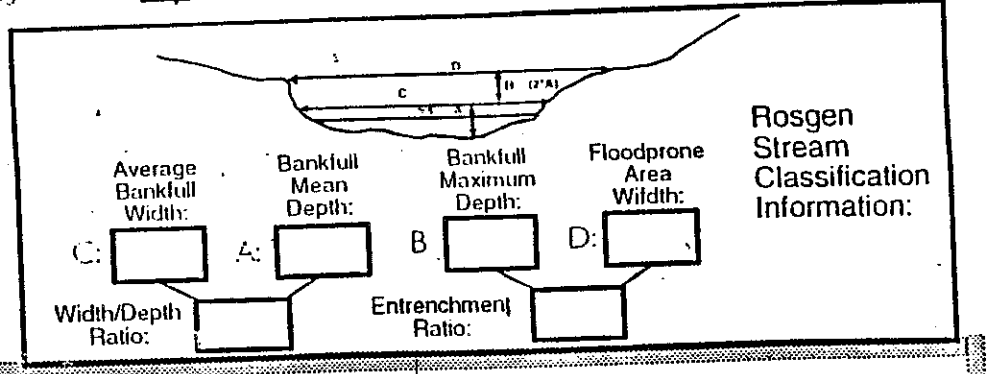
Major Suspected Impacts (✓ All That Apply)

- None
- Industrial
- WWTP
- Ag
- Livestock
- Silviculture
- Construction
- Urban Runoff
- CSOs
- Suburban Impacts
- Mining
- Channelization
- Riparian Removal
- Landfills
- Natural
- Flow Alteration
- Other: _____

Qualitative Rating (1-10)	Aesthetic Rating (1-10)
7	7

First Sampling Pass: Gear D Distance 200 Water Clarity _____ Water Stage low CANOPY (% OPEN) _____

Ohio EPA



STREAM MEASUREMENTS:

AVERAGE WIDTH: ____

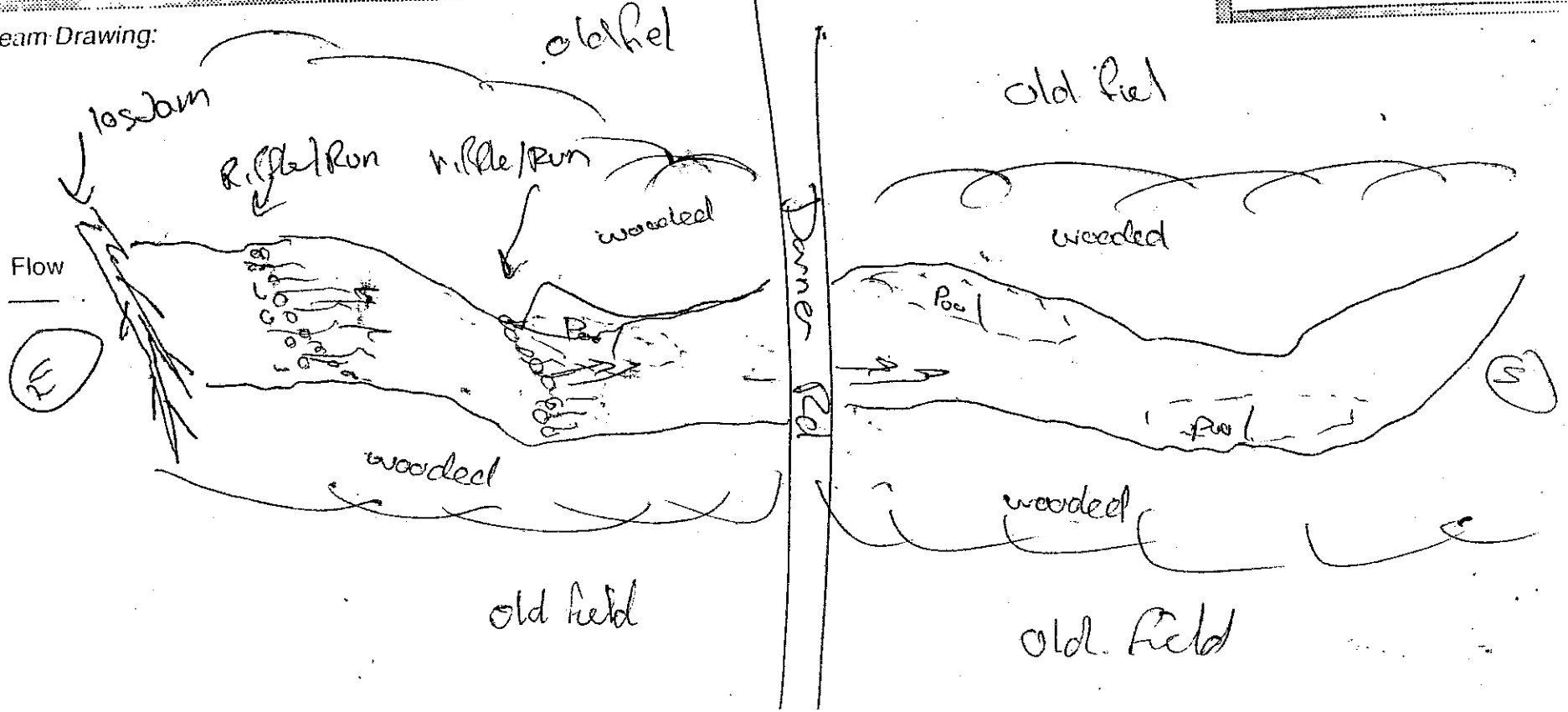
AVERAGE DEPTH: ____

MAXIMUM DEPTH: ____

GRADIENT:

- -LOW
- -MODERATE
- -HIGH

Stream Drawing:



OhioEPA Qualitative Habitat Evaluation Index Field Sheet QHEI Score: ____

River Code 98 RM: 9.9 Stream Middle Fork Little Beaver

Date 8/5/99 Location ust Perino sand and Gravel - adj SR 154

Scorers Initials: CER Comments ____

1) SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Estimate % present*);

TYPE	POOL	RIFFLE
☐ ☐-BLDR/SLBS[10]	___	___
☐ ☐-BOULDER [9]	X	X
☐ ☐-COBBLE [8]	X	X
☐ ☐-HARDPAN [4]	___	___
☐ ☐-MUCK [2]	___	___
☐ ☐-SILT [2]	___	___
☐ ☐-GRAVEL [7]	X	X
☐ ☐-SAND [6]	X	X
☐ ☐-BEDROCK[5]	___	___
☐ ☐-DETRITUS[3]	___	___
☐ ☐-ARTIFICIAL[0]	X	___

NOTE : (Ignore sludge originating from point-sources: score on natural substrates)

NUMBER OF SUBSTRATE TYPES: ☒ 4 or Less [0] ☐ 5 or More [2]

COMMENTS ____

SUBSTRATE ORIGIN (Check ONE (OR 2 & AVERAGE)		SUBSTRATE QUALITY (Check ONE (OR 2 & AVERAGE	
☐ -LIMESTONE [1]	SILT:	☐ -SILT HEAVY [-2]	Substrate
☐ -TILLS [1]		☐ -SILT MODERATE [-1]	
☐ -WETLANDS[0]		☐ -SILT NORMAL [0]	
☐ -HARDPAN [0]		☐ -SILT FREE [1]	
☐ -SANDSTONE [0]	EMBEDDED	☐ -EXTENSIVE [-2]	
☐ -RIP/RAP [0]	NESS:	☐ -MODERATE [-1]	
☐ -LACUSTRINE [0]		☐ -NORMAL [0]	
☐ -SHALE [-1]		☐ -NONE [1]	
☐ -COAL FINES [-2]			

Max 20

2] INSTREAM COVER

TYPE: (Check *All* That Apply)

☐ -UNDERCUT BANKS [1] ☐ -POOLS> 70 cm [2] ☐ -OXBOWS, BACKWATERS [1]

☐ -OVERHANGING VEGETATION [1] ☐ -ROOTWADS [1] ☐ -AQUATIC MACROPHYTES [1]

☐ -SHALLOWS (IN SLOW WATER) [1] ☐ -BOULDERS [1] ☐ -LOGS OR WOODY DEBRIS [1]

☐ -ROOTMATS [1] COMMENTS: ____

AMOUNT: (Check *ONLY* One or check 2 and *AVERAGE*)

☐ - EXTENSIVE > 75% [11]

☐ - MODERATE 25-75% [7]

☐ - SPARSE 5-25% [3]

☐ - NEARLY ABSENT < 5% [1]

Cover

Max 20

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐ -HIGH [4]	☐ - EXCELLENT [7]	☐ -NONE [6]	☐ -HIGH [3]	☐ -SNAGGING	☐ -IMPOUND.
☐ -MODERATE [3]	☐ -GOOD [5]	☐ - RECOVERED [4]	☐ -MODERATE [2]	☐ -RELOCATION	☐ -ISLANDS
☐ -LOW [2]	☐ - FAIR [3]	☐ -RECOVERING [3]	☐ -LOW [1]	☐ -CANOPY REMOVAL	☐ - LEVEED
☐ -NONE [1]	☐ -POOR [1]	☐ - RECENT OR NO RECOVERY [1]		☐ -DREDGING	☐ -BANK SHAPING
				☐ -ONE SIDE CHANNEL MODIFICATIONS	

Channel

Max 20

COMMENTS: ____

4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstrea

RIPARIAN WIDTH (L R (Per Bank))	FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN) (L R (Most Predominant Per Bank))		BANK EROSION (L R (Per Bank))	
☐ ☐ -WIDE > 50m [4]	☐ ☐-FOREST, SWAMP [3]	☐ ☐-CONSERVATION TILLAGE [1]	☐ ☐-NONE/LITTLE [3]	
☐ ☐-MODERATE 10-50m [3]	☐ ☐-SHRUB OR OLD FIELD [2]	☐ ☐-URBAN OR INDUSTRIAL [0]	☒ ☐-MODERATE [2]	
☐ ☒ -NARROW 5-10m [2]	☒ ☒-RESIDENTIAL, PARK, NEW FIELD [1]	☐ ☐-OPEN PASTURE, ROWCROP [0]	☐ ☐-HEAVY/SEVERE [1]	
☒ ☐ -VERY NARROW < 5m [1]	☐ ☐-FENCED PASTURE [1]	☐ ☐-MINING/CONSTRUCTION [0]		
☐ ☐ -NONE [0]				

Riparian

Max 10

COMMENTS: ____

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)	MORPHOLOGY (Check 1 or 2 & AVERAGE)	CURRENT VELOCITY (POOLS & RIFFLES!) (Check *All* That Apply)	
☒ > 1m [6]	☒ -POOL WIDTH > RIFFLE WIDTH [2]	☒ -EDDIES [1]	☐ -TORRENTIAL [-1]
☐ - 0.7-1m [4]	☐ -POOL WIDTH = RIFFLE WIDTH [1]	☒ -FAST [1]	☐ -INTERSTITIAL [-1]
☐ - 0.4-0.7m [2]	☐ -POOL WIDTH < RIFFLE W. [0]	☒ -MODERATE [1]	☐ -INTERMITTENT [-2]
☐ - 0.2-0.4m [1]		☒ -SLOW [1]	
☐ - < 0.2m [POOL=0]			

Pool/Current

Max 12

COMMENTS: ____

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
☐ - Generally > 10 cm, MAX > 50 [4]	☒ STABLE (e.g., Cobble, Boulder) [2]	☐ - NONE [2]
☒ - Generally > 10 cm, MAX < 50 [3]	☒ MOD. STABLE (e.g., Large Gravel) [1]	☐ - LOW [1]
☒ Generally 5-10 cm [1]	☐ -UNSTABLE (Fine Gravel, Sand) [0]	☐ - MODERATE [0]
☐ - Generally < 5 cm [RIFFLE=0]		☐ - EXTENSIVE [-1]

Riffle/Ru

Max 8

COMMENTS: ____ ☐ - NO RIFFLE [Metric=0]

Gradien

Max 10

GRADIENT (ft/mi): 8.16 DRAINAGE AREA (sq.mi.): 172

%POOL: ____ %GLIDE: ____

%RIFFLE: ____ %RUN: ____

Sampling Reach Representative of Stream? (Y/N) Y If Not, Explain: Recovery from past Channelization

Additional Comments/Pollution Impacts: _____

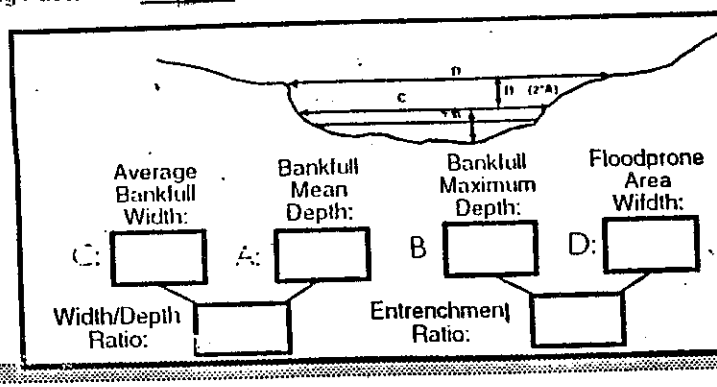
Major Suspected Impacts (✓ All That Apply)
None ☐
Industrial ☐
WWTP ☐
Ag ☐
Livestock ☐
Silviculture ☐
Construction ☐
Urban Runoff ☐
CSOs ☐
Suburban Impacts ☐
Mining ☐
Channelization ☐
Riparian Removal ☐
Landfills ☐
Natural ☐
Flow Alteration ☐
Other: _____ ☐

Qualitative Rating (1-10): 7

Aesthetic Rating (1-10): 7

First Sampling Pass: Gear: D | Distance: 200 | Water Clarity: _____ | Water Stage: Norm | CANOPY (% OPEN): 50%

OhioEPA



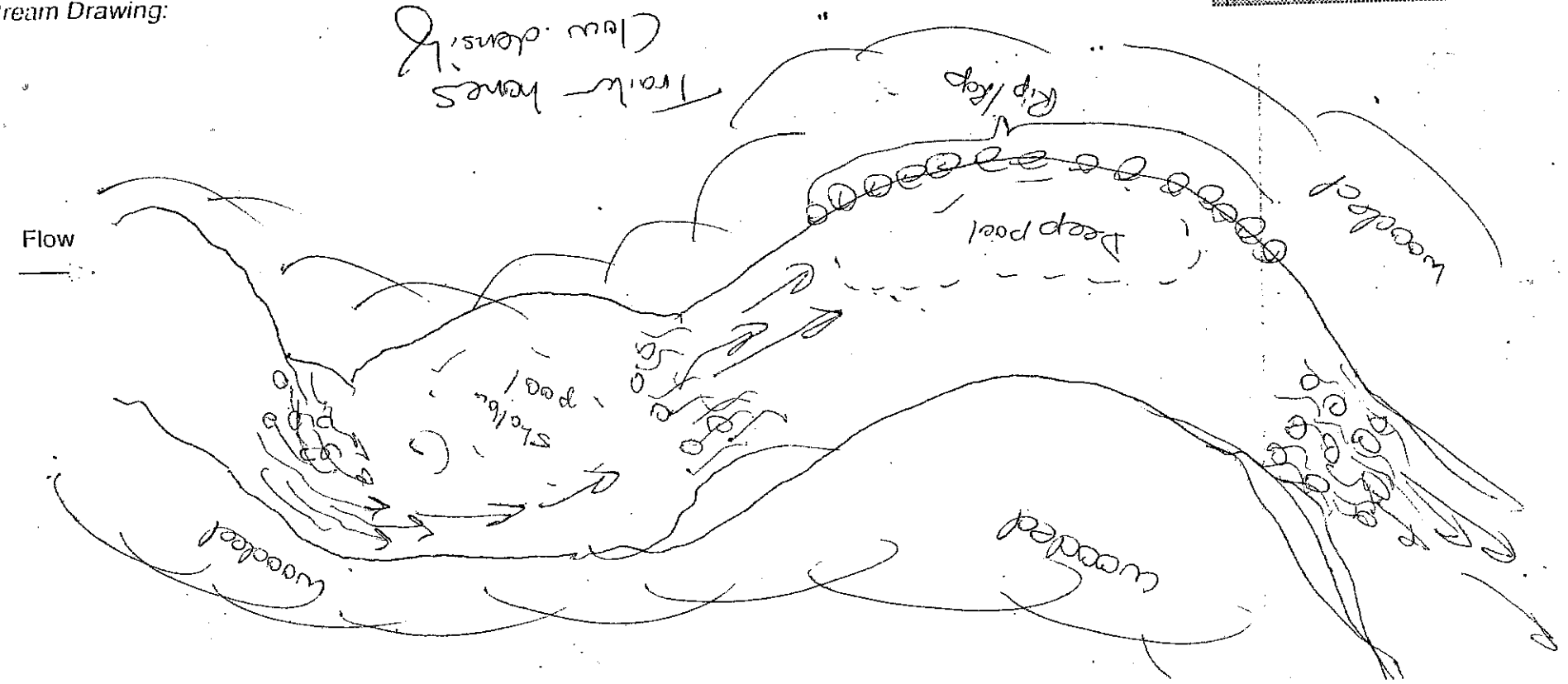
STREAM MEASUREMENTS. GRADIENT:

AVERAGE WIDTH: ___ ☐ -LOW

AVERAGE DEPTH: ___ ☐ -MODERATE

MAXIMUM DEPTH: ___ ☐ -HIGH

Stream Drawing:



Qualitative Habitat Evaluation Index Field Sheet

River Code: 08 RM: 10.9 Stream Middle Fork Little Beaver
Date 8/5/99 Location dst. Lisbon CSOs / US 30/45
Scorers Initials: CEB Comments

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Estimate % present*);

TYPE	POOL	RIFFLE
☐ ☐-BLDR /SLBS[10]	___	___
☒ ☐-BOULDER [9]	XX	XX
☐ ☒-COBBLE [8]	XX	XX
☐ ☐-HARDPAN [4]	___	___
☐ ☐-MUCK [2]	___	___
☐ ☐-SILT [2]	___	___
☐ ☐-GRAVEL [7]	X	X
☐ ☐-SAND [6]	X	X
☐ ☐-BEDROCK[5]	___	___
☐ ☐-DETRITUS[3]	X	X
☐ ☐-ARTIFICIAL[0]	X	X

NOTE : *(Ignore sludge originating from point-sources; score on natural substrates)*

NUMBER OF SUBSTRATE TYPES: ☒-*5 or More [2]* ☐-*4 or Less [0]*

SUBSTRATE ORIGIN	POOL	RIFFLE
Check ONE (OR 2 & AVERAGE)		
☐-*LIMESTONE [1]*	X	X
☐-*TILLS [1]*	___	___
☐-*WETLANDS[0]*	X	X
☐-*HARDPAN [0]*	X	X
☒-*SANDSTONE [0]*	X	X
☐-*RIP/RAP [0]*		
☐-*LACUSTRINE [0]*		
☐-*SHALE [-1]*		
☐-*COAL FINES [-2]*		

SUBSTRATE QUALITY
Check ONE (OR 2 & AVERAGE
SILT:
☐-*SILT HEAVY [-2]*
☒-*SILT MODERATE [-1]*
☐-*SILT NORMAL [0]*
☐-*SILT FREE [1]*
EMBEDDED NESS:
☐-*EXTENSIVE [-2]*
☒-*MODERATE [-1]*
☐-*NORMAL [0]*
☐-*NONE [1]*

Substrate ☐ Max 20

COMMENTS

2] INSTREAM COVER

TYPE: (Check *All* That Apply)

☐-*UNDERCUT BANKS [1]*
☒-*OVERHANGING VEGETATION [1]*
☐-*SHALLOWS (IN SLOW WATER) [1]*
☐-*ROOTMATS[1]*
☒-*POOLS> 70 cm [2]*
☐-*ROOTWADS [1]*
☐-*BOULDERS[1]*
☐-*OXBOWS, BACKWATERS [1]*
☐-*AQUATIC MACROPHYTES [1]*
☐-*LOGS OR WOODY DEBRIS[1]*

COMMENTS: most our deriveel from substrate

AMOUNT: (Check *ONLY* One or check 2 and *AVERAGE*)

☐-*EXTENSIVE > 75% [11]*
☐-*MODERATE 25-75% [7]*
☒-*SPARSE 5-25% [3]*
☐-*NEARLY ABSENT < 5% [1]*

Cover ☐ Max 20

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐-*HIGH[4]*	☐-*EXCELLENT[7]*	☐-*NONE[6]*	☒-*HIGH[3]*	☐-*SNAGGING*	☐-*IMPOUND.*
☐-*MODERATE[3]*	☒-*GOOD[5]*	☐-*RECOVERED[4]*	☐-*MODERATE[2]*	☐-*RELOCATION*	☐-*ISLANDS*
☒-*LOW[2]*	☒-*FAIR[3]*	☒-*RECOVERING[3]*	☐-*LOW[1]*	☐-*CANOPY REMOVAL*	☐-*LEVEED*
☐-*NONE[1]*	☐-*POOR[1]*	☐-*RECENT OR NO RECOVERY[1]*		☐-*DREDGING*	☐-*BANKSHAPING*
				☐-*ONE SIDE CHANNEL MODIFICATIONS*	

Channel ☐ Max 20

COMMENTS:

4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstrea

RIPARIAN WIDTH (L R Per Bank)	FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN) (L R Most Predominant Per Bank)	BANK EROSION (L R Per Bank)
☐ ☐-*WIDE > 50m[4]*	☐ ☐-*FOREST, SWAMP[3]*	☒ ☒-*NONE/LITTLE[3]*
☐ ☐-*MODERATE 10-50m[3]*	☐ ☐-*SHRUB OR OLD FIELD[2]*	☒ ☒-*MODERATE[2]*
☐ ☐-*NARROW 5-10m[2]*	☐ ☐-*RESIDENTIAL, PARK, NEW FIELD[1]*	☐ ☐-*HEAVY/SEVERE[1]*
☒ ☒-*VERY NARROW <5m[1]*	☐ ☐-*FENCED PASTURE[1]*	
☐ ☐-*NONE[0]*	☒ ☒-*URBAN OR INDUSTRIAL[0]*	
	☐ ☐-*OPEN PASTURE, ROWCROP[0]*	
	☐ ☐-*MINING/CONSTRUCTION[0]*	

Riparian ☐ Max 10

COMMENTS:

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)

☐-*> 1m [6]*
☐-*0.7-1m[4]*
☐-*0.4-0.7m[2]*
☐-*0.2-0.4m[1]*
☐-*< 0.2m [POOL=0]*

MORPHOLOGY (Check 1 or 2 & AVERAGE)

☐-*POOL WIDTH > RIFFLE WIDTH [2]*
☐-*POOL WIDTH = RIFFLE WIDTH [1]*
☐-*POOL WIDTH < RIFFLE W.[0]*

CURRENT VELOCITY (POOLS & RIFFLES!) (Check *All* That Apply)

☐-*EDDIES[1]*
☐-*FAST[1]*
☐-*MODERATE[1]*
☐-*SLOW[1]*
☐-*TORRENTIAL[-1]*
☐-*INTERSTITIAL[-1]*
☐-*INTERMITTENT[-2]*

Pool/ Current ☐ Max 12

COMMENTS:

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE/RUN DEPTH

☐-*Generally > 10 cm, MAX > 50 [4]*
☐-*Generally > 10 cm, MAX < 50 [3]*
☐-*Generally 5-10 cm[1]*
☐-*Generally < 5 cm [RIFFLE=0]*

RIFFLE/RUN SUBSTRATE

☐-*STABLE (e.g., Cobble, Boulder) [2]*
☐-*MOD. STABLE (e.g., Large Gravel) [1]*
☐-*UNSTABLE (Fine Gravel, Sand) [0]*

RIFFLE/RUN EMBEDDEDNESS

☐-*NONE [2]*
☐-*LOW [1]*
☐-*MODERATE [0]*
☐-*EXTENSIVE [-1]*

☐-*NO RIFFLE [Metric=0]*

Riffle/Run ☐ Max 8
Gradient ☐ Max 10

COMMENTS:

GRADIENT (ft/mi): 8.16 DRAINAGE AREA (sq.mi.): 105

%POOL: %GLIDE:
%RIFFLE: %RUN:

Sampling Reach Representative of Stream? (Y/N) Y If Not, Explain: Recovering from channelization

Additional Comments/Pollution Impacts:

Major Suspected Impacts (✓ All That Apply)
None ☐
Industrial ☐
WWTP ☐
Ag ☐
Livestock ☐
Silviculture ☐
Construction ☐
Urban Runoff ☐
CSOs ☐
Suburban Impacts ☐
Mining ☐
Channelization ☐
Riparian Removal ☐
Landfills ☐
Natural ☐
Flow Alteration ☐
Other: ☐

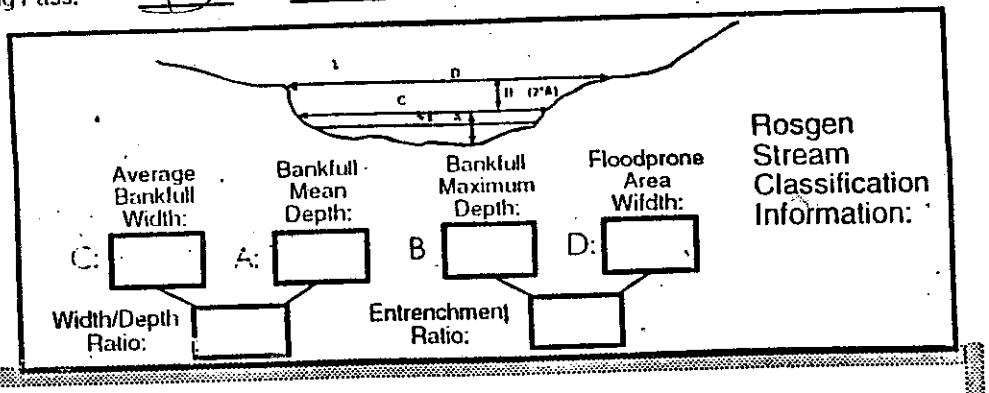
Subjective Rating (1-10): 7
Aesthetic Rating (1-10): 7

First Sampling Pass: Gear: D | Distance: 200 | Water Clarity: 10s+ | Water Stage: Norm | CANOPY (% OPEN): 70C

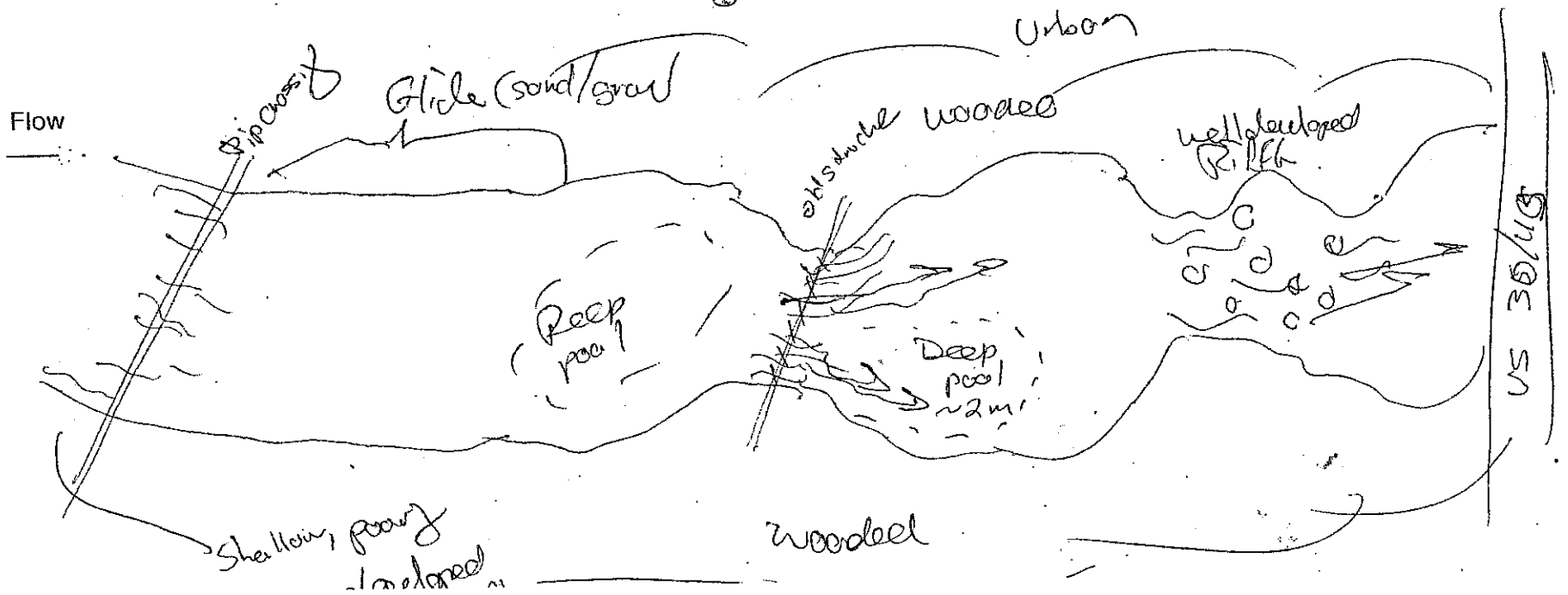
OhioEPA

STREAM MEASUREMENTS:
AVERAGE WIDTH: ____
AVERAGE DEPTH: ____
MAXIMUM DEPTH: ____

GRADIENT:
☐ -LOW
☒ -MODERATE
☐ -HIGH



Stream Drawing: fairly strong urban "odor" as well as urban debris — typical of CSO input. "Scum" in pool areas, Fish: community, however, looked small. Fish species included banded Darters, Redface Chubsucker shiner.



OhioEPA Qualitative Habitat Evaluation Index Field Sheet QHEI Score: ☐

River Code: 08-200 RM: 15.0 Stream Middle Fork Little Beaver Creek
Date 7-15-99 Location Kelch Rd bridge
Scorers Initials: DA Comments LAT/LONG = 40 47 27 / 80 48 44

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Estimate % present*);

TYPE	POOL	RIFFLE
☐ ☐-BLDR /SLBS[10]	✓	
☐ ☐-BOULDER [9]	✓	
☒ ☐-COBBLE [8]	✓	
☐ ☐-HARDPAN [4]		
☐ ☐-MUCK [2]		
☐ ☐-SILT [2]	✓	
☒ ☐-GRAVEL [7]		✓
☐ ☐-SAND [6]		✓
☐ ☐-BEDROCK[5]		
☐ ☐-DETRITUS[3]		✓
☐ ☐-ARTIFICIAL[0]		

NOTE: (Ignore sludge originating from point-sources; score on natural substrates)
NUMBER OF SUBSTRATE TYPES: ☒-5 or More [2] ☐-4 or Less [0]

SUBSTRATE ORIGIN (Check ONE (OR 2 & AVERAGE)): ☐ -LIMESTONE [1] ☒ -TILLS [1] ☐ -WETLANDS[0] ☐ -HARDPAN [0] ☐ -SANDSTONE [0] ☐ -RIP/RAP [0] ☐ -LACUSTRINE [0] ☐ -SHALE [-1] ☐ -COAL FINES [-2]

SUBSTRATE QUALITY (Check ONE (OR 2 & AVERAGE)): SILT: ☐ -SILT HEAVY [-2] ☒ -SILT MODERATE [-1] ☒ -SILT NORMAL [0] ☐ -SILT FREE [1]
EMBEDDEDNESS: ☐ -EXTENSIVE [-2] ☒ -MODERATE [-1] ☒ -NORMAL [0] ☐ -NONE [1]

Substrate ☐ Max 20

COMMENTS:

2] INSTREAM COVER (see back for instructions for additional cover scoring method)

TYPE: (Check *All* That Apply)
☐ ___UNDERCUT BANKS [1]
☐ ___OVERHANGING VEGETATION [1]
☒ 2 SHALLOWS (IN SLOW WATER) [1]
☐ ___ROOTMATS [1]
☒ 2 POOLS> 70 cm [2]
☒ 1 ROOTWADS [1]
☒ 2 BOULDERS [1]
☐ ___OXBOWS, BACKWATERS [1]
☐ ___AQUATIC MACROPHYTES [1]
☒ 1 LOGS OR WOODY DEBRIS [1]

AMOUNT: (Check *ONLY* One or check 2 and *AVERAGE*)
☐ - EXTENSIVE > 75% [11]
☒ - MODERATE 25-75% [7]
☐ - SPARSE 5-25% [3]
☐ - NEARLY ABSENT < 5%[1]

COMMENTS:

Cover ☐ Max 20

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY
☐ - HIGH [4]
☒ - MODERATE [3]
☐ - LOW [2]
☐ - NONE [1]

DEVELOPMENT
☒ - EXCELLENT [7]
☒ - GOOD [5]
☐ - FAIR [3]
☐ - POOR [1]

CHANNELIZATION
☒ - NONE [6]
☐ - RECOVERED [4]
☐ - RECOVERING [3]
☐ - RECENT OR NO RECOVERY [1]

STABILITY
☒ - HIGH [3]
☐ - MODERATE [2]
☐ - LOW [1]

MODIFICATIONS/OTHER
☐ - SNAGGING ☐ - IMPOUND.
☐ - RELOCATION ☐ - ISLANDS
☐ - CANOPY REMOVAL ☐ - LEVEED
☐ - DREDGING ☐ - BANK SHAPING
☐ - ONE SIDE CHANNEL MODIFICATIONS

Channel ☐ Max 20

COMMENTS:

4]. RIPARIAN ZONE AND BANK EROSION-(check *ONE box per bank or check 2 and AVERAGE per bank*) ★River Right Looking Downstream★

RIPARIAN WIDTH (L R (Per Bank))
☐☒ -WIDE > 50m [4]
☐☐ - MODERATE 10-50m [3]
☒☐ -NARROW 5-10 m [2]
☐☐ - VERY NARROW <5 m[1]
☐☐ - NONE [0]

FLOOD PLAIN QUALITY (*PAST 100 Meter RIPARIAN*) (L R (Most Predominant Per Bank))
☒☒ FOREST, SWAMP [3]
☐☐ -SHRUB OR OLD FIELD [2]
☐☐ -RESIDENTIAL,PARK,NEW FIELD [1]
☐☐ -FENCED PASTURE [1]
☐☐ -CONSERVATION TILLAGE [1]
☐☐ -URBAN OR INDUSTRIAL [0]
☐☐ -OPEN PASTURE,ROWCROP [0]
☐☐ -MINING/CONSTRUCTION [0]

BANK EROSION (L R (Per Bank))
☒☒ -NONE/LITTLE [3]
☐☐ -MODERATE [2]
☐☐ -HEAVY/SEVERE[1]

Riparian ☐ Max 10

COMMENTS:

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)
☒ - >1m [6]
☐ - 0.7-1m [4]
☐ - 0.4-0.7m [2]
☐ - 0.2-0.4m [1]
☐ - < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE)
☒ -POOL WIDTH > RIFFLE WIDTH [2]
☐ -POOL WIDTH = RIFFLE WIDTH [1]
☐ -POOL WIDTH< RIFFLE W. [0]

CURRENT VELOCITY [POOLS & RIFFLES!] (*Check All That Apply*)
☐ -EDDIES[1] ☐ -TORRENTIAL[-1]
☒ -FAST[1] ☐ -INTERSTITIAL[-1]
☒ -MODERATE [1] ☐ -INTERMITTENT[-2]
☒ -SLOW [1]

Pool/ Current ☐ Max 12

COMMENTS:

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE DEPTH
☒ - Best Areas >10 cm [2]
☐ - Best Areas 5-10 cm[1]
☐ - Best Areas < 5 cm [RIFFLE=0]

RUN DEPTH
☒ - MAX > 50 [2]
☐ - MAX < 50[1]

RIFFLE/RUN SUBSTRATE
☒ -STABLE (e.g., Cobble, Boulder) [2]
☒ -MOD. STABLE (e.g., Large Gravel) [1]
☐ -UNSTABLE (Fine Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
☐ - NONE [2]
☒ - LOW [1]
☐ - MODERATE [0]
☐ - EXTENSIVE [-1]

☐ - NO RIFFLE [Metric=0]

Riffle/Run ☐ Max 8
Gradient ☐ Max 10

COMMENTS:

6] GRADIENT (ft/mi): 7.84 **DRAINAGE AREA (sq.mi.):** 96

%POOL: 45 %GLIDE: ☐
%RIFFLE: 25 %RUN: 30

*Best areas must be large enough to support a population of riffle-obligate fish species.

Is Sampling Reach Representative of the Stream (Y/N) Y If Not, Explain: _____

Major Suspected Sources of Impacts (Check All That Apply):
None ☐
Industrial ☐
WWTP ☐
Ag ☐
Livestock ☐
Silviculture ☐
Construction ☐
Urban Runoff ☐
CSOs ☐
Suburban Impacts ☐
Mining ☐
Channelization ☐
Riparian Removal ☐
Landfills ☐
Natural ☐
Dams ☐
Other Flow Alteration ☐
Other: _____ ☐

	Gear:	Distance:	Water Clarity:	Water Stage:	Canopy -% Open
First Sampling Pass	D	0.20	>100	LOW	5

Subjective Rating (1-10) ☐

Aesthetic Rating (1-10) ☐

Gradient: ☐ - Low, ☒ - Moderate, ☐ -High

Stream Measurements:

Average Width	Average Depth	Maximum Depth	Av. Bankfull Width	Bankfull Mean Depth	W/D Ratio	Bankfull Max Depth	Floodprone Area Width	Entrench Ratio
12M	50cm	105cm						

Stream Drawing:

Instructions for Scoring the Alternate Cover Metric: Each Cover Type Should Receive a Score of Between 0 and 3, Where: 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

Yes	No	
☐	☐	Is Stream Ephemeral (No pools, totally dry or only damp spots)?
☐	☐	Is There Water Upstream? How Far: _____
☐	☐	Is There Water Close Downstream? How Far: _____
☐	☐	*Is Dry Channel Mostly Natural?*

OhioEPA Qualitative Habitat Evaluation Index Field Sheet QHEI Score: ____

River Code 08-200 RM: 20.9 Stream M.F. LITTLE BEAVER CR.
Date 071599 Location SR 558
Scorers Initials: DTA Comments LAT/LONG: 40 51 24/80 47 43

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Estimate % present*);

TYPE	POOL	RIFFLE
☐☐-BLDR /SLBS[10]	___	___
☐☐-BOULDER [9]	___	___
☐☐-COBBLE [8]	___	✓
☐☐-HARDPAN [4]	___	___
☐☐-MUCK [2]	___	✓
☐☐-SILT [2]	___	___
☐☐-GRAVEL [7]	___	✓
☒☒-SAND [6]	___	✓
☐☐-BEDROCK[5]	___	___
☐☐-DETRITUS[3]	___	✓
☐☐-ARTIFICIAL[0]	___	___

NOTE: (Ignore sludge originating from point-sources; score on natural substrates)
NUMBER OF SUBSTRATE TYPES: ☒-5 or More [2] ☐-4 or Less [0]

Check ONE (OR 2 & AVERAGE) SILT:
☐ -LIMESTONE [1]
☒ -TILLS [1]
☐ -WETLANDS[0]
☐ -HARDPAN [0]
☐ -SANDSTONE [0]
☐ -RIP/RAP [0]
☐ -LACUSTRINE [0]
☐ -SHALE [-1]
☐ -COAL FINES [-2]

EMBEDDEDNESS:

Check ONE (OR 2 & AVERAGE) SUBSTRATE QUALITY
☐ -SILT HEAVY [-2]
☒ -SILT MODERATE [-1]
☐ -SILT NORMAL [0]
☐ -SILT FREE [1]
☒ -EXTENSIVE [-2]
☐ -MODERATE [-1]
☐ -NORMAL [0]
☐ -NONE [1]

Substrate ____ Max 20

COMMENTS: ____

2] INSTREAM COVER (see back for instructions for additional cover scoring method)

TYPE: (Check *All* That Apply)
☒ 1 UNDERCUT BANKS [1]
☒ 2 OVERHANGING VEGETATION [1]
☒ 1 SHALLOWS (IN SLOW WATER) [1]
☐ ___ ROOTMATS [1]
☒ 1 POOLS> 70 cm [2]
☒ 1 ROOTWADS [1]
☐ ___ BOULDERS [1]
☐ ___ OXBOWS, BACKWATERS [1]
☒ 1 AQUATIC MACROPHYTES [1]
☒ 1 LOGS OR WOODY DEBRIS [1]

AMOUNT: (Check *ONLY* One or check 2 and *AVERAGE*)
☐ - EXTENSIVE > 75% [11]
☐ - MODERATE 25-75% [7]
☒ - SPARSE 5-25% [3]
☐ - NEARLY ABSENT < 5% [1]

COMMENTS: ____

Cover ____ Max 20

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐ - HIGH [4]	☐ - EXCELLENT [7]	☐ - NONE [6]	☐ - HIGH [3]	☐ - SNAGGING	☐ - IMPOUND.
☐ - MODERATE [3]	☐ - GOOD [5]	☐ - RECOVERED [4]	☒ - MODERATE [2]	☐ - RELOCATION	☐ - ISLANDS
☐ - LOW [2]	☒ - FAIR [3]	☐ - RECOVERING [3]	☒ - LOW [1]	☒ - CANOPY REMOVAL	☐ - LEVEED
☒ - NONE [1]	☐ - POOR [1]	☒ - RECENT OR NO RECOVERY [1]		☒ - DREDGING	☐ - BANK SHAPING
				☐ - ONE SIDE CHANNEL MODIFICATIONS	

Channel ____ Max 20

COMMENTS: ____

4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH L R (Per Bank)	FLOOD PLAIN QUALITY (*PAST 100 Meter RIPARIAN*) L R (*Most Predominant Per Bank*)	L R	BANK EROSION L R (Per Bank)
☐☐ - WIDE > 50m [4]	☐☐-FOREST, SWAMP [3]	☐☐-CONSERVATION TILLAGE [1]	☒☒-NONE/LITTLE [3]
☐☐ - MODERATE 10-50m [3]	☐☐-SHRUB OR OLD FIELD [2]	☐☐-URBAN OR INDUSTRIAL [0]	☐☐-MODERATE [2]
☒☒ - NARROW 5-10 m [2]	☒☐-RESIDENTIAL,PARK,NEW FIELD [1]	☐☒-OPEN PASTURE,ROWCROP [0]	☐☐-HEAVY/SEVERE[1]
☐☐ - VERY NARROW <5 m[1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☒☒ - NONE [0]			

COMMENTS: ____

Riparian ____ Max 10

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)
☒ - >1m [6]
☐ - 0.7-1m [4]
☐ - 0.4-0.7m [2]
☐ - 0.2-0.4m [1]
☐ - < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE)
☐ -POOL WIDTH > RIFFLE WIDTH [2]
☒ -POOL WIDTH = RIFFLE WIDTH [1]
☐ -POOL WIDTH< RIFFLE W. [0]

CURRENT VELOCITY [POOLS & RIFFLES!] (Check *All* That Apply)
☐ -EDDIES[1]
☐ -FAST[1]
☐ -MODERATE [1]
☒ -SLOW [1]
☐ -TORRENTIAL[-1]
☐ -INTERSTITIAL[-1]
☐ -INTERMITTENT[-2]

COMMENTS: ____

Pool/ Current ____ Max 12

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE DEPTH	RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
☐ -Best Areas >10 cm [2]	☐ - MAX > 50 [2]	☐-STABLE (e.g.,Cobble, Boulder) [2]	☐ - NONE [2]
☐ - Best Areas 5-10 cm[1]	☐ - MAX < 50[1]	☐-MOD. STABLE (e.g.,Large Gravel) [1]	☐ - LOW [1]
☐ - Best Areas < 5 cm [RIFFLE=0]		☐-UNSTABLE (Fine Gravel,Sand) [0]	☐ - MODERATE [0]
			☐ - EXTENSIVE [-1]

COMMENTS: ____ (☒) NO RIFFLE [Metric=0]

Riffle/Run ____ Max 8

Gradient ____ Max 10

6] GRADIENT (ft/mi): 3.76 DRAINAGE AREA (sq.mi.): 73

%POOL: 100 %GLIDE: ____
%RIFFLE: ____ %RUN: ____

*Best areas must be large enough to support a population of riffle-obligate fish species.

Is Sampling Reach Representative of the Stream (Y/N) Y If Not, Explain: _____

Major Suspected Sources of Impacts (Check All That Apply):
None ☐
Industrial ☐
WWTP ☐
Ag ☐
Livestock ☐
Silviculture ☐
Construction ☐
Urban Runoff ☐
CSOs ☐
Suburban Impacts ☐
Mining ☐
Channelization ☒
Riparian Removal ☐
Landfills ☐
Natural ☐
Dams ☐
Other Flow Alteration ☐
Other: _____ ☐

	Gear:	Distance:	Water Clarity:	Water Stage:	Canopy -% Open
First Sampling Pass	D	0.20	70	LOW	50

Subjective Rating (1-10) ☐

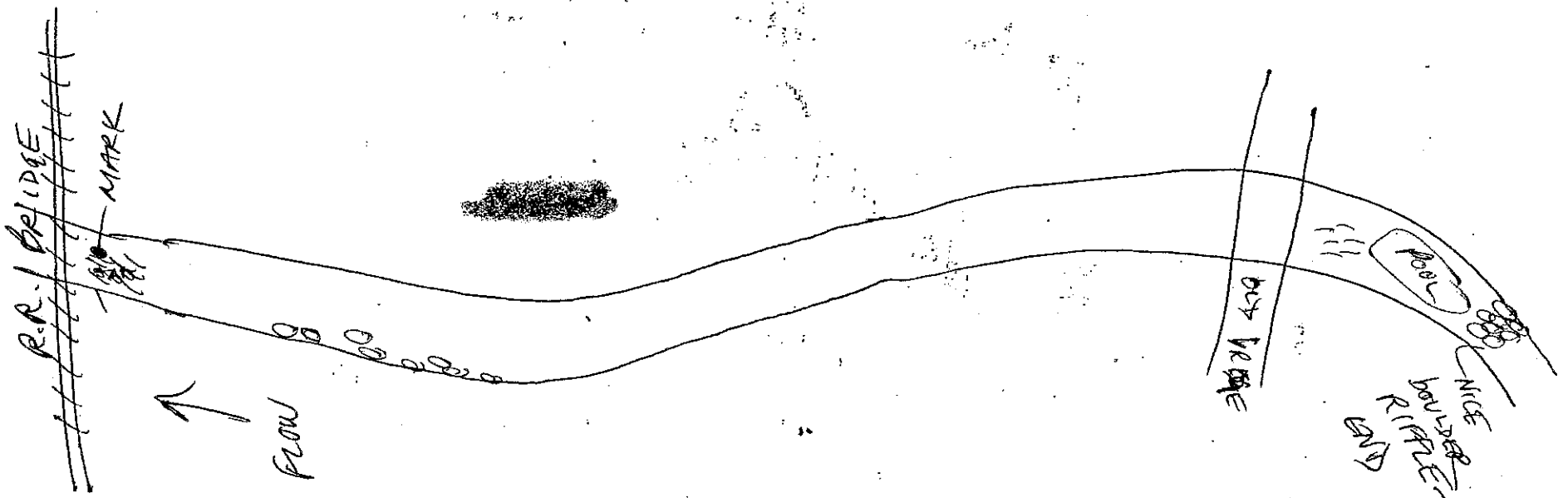
Aesthetic Rating (1-10) ☐

Gradient: ☐ - Low, ☒ - Moderate, ☐ -High

Stream Measurements:

Average Width	Average Depth	Maximum Depth	Av. Bankfull Width	Bankfull Mean Depth	W/D Ratio	Bankfull Max Depth	Floodprone Area Width	Entrench. Ratio
10 M	70 cm	120 cm						

Stream Drawing:



Yes	No	
☐	☒	Is Stream Ephemeral (No pools, totally dry or only damp spots)?
☐	☐	Is There Water Upstream? How Far: _____
☐	☐	Is There Water Close Downstream? How Far: _____
☐	☐	Is Dry Channel Mostly Natural?

Instructions for Scoring the Alternate Cover Metric: Each Cover Type Should Receive a Score of Between 0 and 3, Where: 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

Ohio EPA Qualitative Habitat Evaluation Index Field Sheet QHEI Score:

River Code: 08-210 RM: 23.5 Stream M.F. LITTLE BEAVER CR.
Date 07/99 Location BUTLER RD.
Scorers Initials: DJA Comments LAT/LONG 40 53 16/80 47 25

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Estimate % present*);

TYPE	POOL	RIFFLE
☐☐-BLDR/SLBS[10]	___	___
☐☐-BOULDER [9]	✓	___
☐☐-COBBLE [8]	✓	___
☐☐-HARDPAN [4]	___	___
☒☐-MUCK [2]	✓	___
☐☐-SILT [2]	✓	___
☐☐-GRAVEL [7]	___	✓
☒☐-SAND [6]	✓	___
☐☐-BEDROCK[5]	___	___
☐☐-DETRITUS[3]	___	✓
☐☐-ARTIFICIAL[0]	___	___

NOTE: (Ignore sludge originating from point-sources; score on natural substrates)
NUMBER OF SUBSTRATE TYPES: ☒-5 or More [2] ☐-4 or Less [0]

SUBSTRATE ORIGIN (Check ONE (OR 2 & AVERAGE)):
☐ -LIMESTONE [1]
☒-TILLS [1]
☐ -WETLANDS[0]
☐ -HARDPAN [0]
☐ -SANDSTONE [0]
☐ -RIP/RAP [0]
☐ -LACUSTRINE [0]
☐ -SHALE [-1]
☐-COAL FINES [-2]

SILT:
☐ -SILT HEAVY [-2]
☒-SILT MODERATE [-1]
☐ -SILT NORMAL [0]
☐ -SILT FREE [1]

EMBEDDEDNESS:
☐ -EXTENSIVE [-2]
☒-MODERATE [-1]
☐ -NORMAL [0]
☐ -NONE [1]

SUBSTRATE QUALITY (Check ONE (OR 2 & AVERAGE))

Substrate ☐ Max 20

COMMENTS:

2] INSTREAM COVER (see back for instructions for additional cover scoring method)

TYPE: (Check *All* That Apply)
☒ 1 UNDERCUT BANKS [1]
☒ 2 OVERHANGING VEGETATION [1]
☒ 1 SHALLOWS (IN SLOW WATER) [1]
☐ ROOTMATS [1]
☒ 1 POOLS> 70 cm [2]
☒ 1 ROOTWADS [1]
☒ 1 BOULDERS [1]
☐ OXBOWS, BACKWATERS [1]
☐ AQUATIC MACROPHYTES [1]
☒ 1 LOGS OR WOODY DEBRIS [1]

AMOUNT: (Check *ONLY* One or check 2 and *AVERAGE*)
☐ - EXTENSIVE > 75% [11]
☐ - MODERATE 25-75% [7]
☒ - SPARSE 5-25% [3]
☐ - NEARLY ABSENT < 5% [1]

Cover ☐ Max 20

COMMENTS:

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER
☐ - HIGH [4]	☐ - EXCELLENT [7]	☐ - NONE [6]	☐ - HIGH [3]	☐ - SNAGGING ☐ - IMPOUND.
☐ - MODERATE [3]	☒ - GOOD [5]	☐ - RECOVERED [4]	☒ - MODERATE [2]	☐ - RELOCATION ☐ - ISLANDS
☒ - LOW [2]	☒ - FAIR [3]	☒ - RECOVERING [3]	☒ - LOW [1]	☐ - CANOPY REMOVAL ☐ - LEVEED
☐ - NONE [1]	☐ - POOR [1]	☐ - RECENT OR NO RECOVERY [1]		☒ - DREDGING ☐ - BANK SHAPING
				☐ - ONE SIDE CHANNEL MODIFICATIONS

Channel ☐ Max 20

COMMENTS:

4]. RIPARIAN ZONE AND BANK EROSION (check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH L R (Per Bank)	FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN) L R (Most Predominant Per Bank)	L R	BANK EROSION L R (Per Bank)
☐☐-WIDE > 50m [4]	☐☐-FOREST, SWAMP [3]	☐☐-CONSERVATION TILLAGE [1]	☒☒-NONE/LITTLE [3]
☐☐ - MODERATE 10-50m [3]	☒☒-SHRUB OR OLD FIELD [2]	☐☐-URBAN OR INDUSTRIAL [0]	☐☐-MODERATE [2]
☐☒-NARROW 5-10 m [2]	☒☐-RESIDENTIAL,PARK,NEW FIELD [1]	☐☐-OPEN PASTURE,ROWCROP [0]	☐☐-HEAVY/SEVERE[1]
☒☐ - VERY NARROW <5 m[1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐ - NONE [0]			

Riparian ☐ Max 10

COMMENTS:

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)
☒ - >1m [6]
☐ - 0.7-1m [4]
☐ - 0.4-0.7m [2]
☐ - 0.2-0.4m [1]
☐ - < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE)
☒ -POOL WIDTH > RIFFLE WIDTH [2]
☐ -POOL WIDTH = RIFFLE WIDTH [1]
☐ -POOL WIDTH< RIFFLE W. [0]

CURRENT VELOCITY (POOLS & RIFFLES!) (Check *All* That Apply)
☐ -EDDIES[1]
☒ -FAST[1]
☒ -MODERATE [1]
☒ -SLOW [1]
☐ -TORRENTIAL[-1]
☐ -INTERSTITIAL[-1]
☐ -INTERMITTENT[-2]

Pool/ Current ☐ Max 12

COMMENTS:

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE DEPTH	RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
☒ - Best Areas >10 cm [2]	☒ - MAX > 50 [2]	☒-STABLE (e.g.,Cobble, Boulder) [2]	☐ - NONE [2]
☐ - Best Areas 5-10 cm[1]	☐ - MAX < 50[1]	☒-MOD. STABLE (e.g.,Large Gravel) [1]	☒ - LOW [1]
☐ - Best Areas < 5 cm [RIFFLE=0]		☐-UNSTABLE (Fine Gravel,Sand) [0]	☒ - MODERATE [0]
			☐ - EXTENSIVE [-1]

☐ - NO RIFFLE [Metric=0]

Riffle/Run ☐ Max 8

COMMENTS:

Gradient ☐ Max 10

6] GRADIENT (ft/mi): 5.21 DRAINAGE AREA (sq.mi.): 36

%POOL: 90 %GLIDE: ___
%RIFFLE: 3 %RUN: 7

*Best areas must be large enough to support a population of riffle-obligate fish species.

Is Sampling Reach Representative of the Stream (Y/N) Y If Not, Explain: _____

Major Suspected Sources of Impacts (Check All That Apply):
None ☐
Industrial ☐
WWTP ☐
Ag ☐
Livestock ☐
Silviculture ☐
Construction ☐
Urban Runoff ☐
CSOs ☐
Suburban Impacts ☐
Mining ☐
Channelization ☒
Riparian Removal ☐
Landfills ☐
Natural ☐
Dams ☐
Other Flow Alteration ☐
Other: _____ ☐

	Gear:	Distance:	Water Clarity:	Water Stage:	Canopy -% Open
First Sampling Pass	D	0.20	50	LOW	60

Subjective Rating (1-10) ☐

Aesthetic Rating (1-10) ☐

Gradient: ☐ - Low, ☐ - Moderate, ☐ -High

Stream Measurements:

Average Width	Average Depth	Maximum Depth	Av. Bankfull Width	Bankfull Mean Depth	W/D Ratio	Bankfull Max Depth	Floodprone Area Width	Entrench. Ratio
14 M	.70	1.20						

Stream Drawing:

Yes	No	
☐	☒	Is Stream Ephemeral (No pools, totally dry or only damp spots)?
☐	☐	Is There Water Upstream? How Far: _____
☐	☐	Is There Water Close Downstream? How Far: _____
☐	☐	Is Dry Channel Mostly Natural?

Instructions for Scoring the Alternate Cover Metric: Each Cover Type Should Receive a Score of Between 0 and 3, Where: 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

ChioEPA Qualitative Habitat Evaluation Index Field Sheet QHEI Score: ☐

River Code: 08-200 RM: 25.8 Stream M. F. L. BEAVER CR.
Date 071499 Location DST. END OF SWAMP
Scorers Initials: DJA Comments LAT/LONG 40 54 32/80 48 31

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Estimate % present*);

TYPE	POOL	RIFFLE
☐ ☐-BLDR /SLBS[10]	___	___
☐ ☐-BOULDER [9]	___✓	___
☐ ☐-COBBLE [8]	___✓	___
☐ ☐-HARDPAN [4]	___	___
☒ ☐-MUCK [2]	___✓	___
☐ ☐-SILT [2]	___	___

	POOL	RIFFLE
☐ ☐-GRAVEL [7]	___	___✓
☒ ☐-SAND [6]	___✓	___
☐ ☐-BEDROCK[5]	___	___
☐ ☐-DETRITUS[3]	___	___✓
☐ ☐-ARTIFICIAL[0]	___	___

NOTE: (Ignore sludge originating from point-sources; score on natural substrates)

NUMBER OF SUBSTRATE TYPES: ☒-5 or More [2] ☐-4 or Less [0]

SUBSTRATE ORIGIN — Check ONE (OR 2 & AVERAGE)
☐ -LIMESTONE [1]
☒ -TILLS [1]
☒ -WETLANDS[0]
☐ -HARDPAN [0]
☐ -SANDSTONE [0]
☐ -RIP/RAP [0]
☐ -LACUSTRINE [0]
☐ -SHALE [-1]
☐-COAL FINES [-2]

SUBSTRATE QUALITY — Check ONE (OR 2 & AVERAGE)
☐ -*SILT HEAVY [-2]*
☒ -SILT MODERATE [-1]
☐ -SILT NORMAL [0]
☐ -SILT FREE [1]

EMBEDDEDNESS:
☐ -EXTENSIVE [-2]
☒ -MODERATE [-1]
☐ -NORMAL [0]
☐ -NONE [1]

Substrate ☐ Max 20

COMMENTS:

2] INSTREAM COVER (see back for instructions for additional cover scoring method)

TYPE: (Check *All* That Apply)
☒ UNDERCUT BANKS [1]
☒ OVERHANGING VEGETATION [1]
☒ SHALLOWS (IN SLOW WATER) [1]
☐ ROOTMATS [1]
☒ POOLS> 70 cm [2]
☒ ROOTWADS [1]
~~☒ BOULDERS [1]~~
☐ OXBOWS, BACKWATERS [1]
☐ AQUATIC MACROPHYTES [1]
☒ LOGS OR WOODY DEBRIS [1]

AMOUNT: (Check *ONLY* One or check 2 and *AVERAGE*)
☐ - EXTENSIVE > 75% [11]
☐ - MODERATE 25-75% [7]
☒ - SPARSE 5-25% [3]
☐ - NEARLY ABSENT < 5%[1]

Cover ☐ Max 20

COMMENTS:

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐ - HIGH [4]	☐ - EXCELLENT [7]	☐ - NONE [6]	☐ - HIGH [3]	☐ - SNAGGING	☐ - IMPOUND.
☐ - MODERATE [3]	☐ - GOOD [5]	☐ - RECOVERED [4]	☒ - MODERATE [2]	☐ - RELOCATION	☐ - ISLANDS
☐ - LOW [2]	☒ - FAIR [3]	☒ - RECOVERING [3]	☐ - LOW [1]	☐ - CANOPY REMOVAL	☐ - LEVEED
☒ - NONE [1]	☐ - POOR [1]	☐ - RECENT OR NO RECOVERY [1]		☒ - DREDGING (OLD)	☐ - BANK SHAPING
				☐ - ONE SIDE CHANNEL MODIFICATIONS	

Channel ☐ Max 20

COMMENTS:

4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH (L R *(Per Bank)*)	FLOOD PLAIN QUALITY *(PAST 100 Meter RIPARIAN)* (L R (Most Predominant Per Bank))		BANK EROSION (L R (Per Bank))	
☐ ☐ -WIDE > 50m [4]	☐ ☐-FOREST, SWAMP [3]	☐ ☐-CONSERVATION TILLAGE [1]	☒ ☒-NONE/LITTLE [3]	
☒ ☐ - MODERATE 10-50m [3]	☐ ☒-SHRUB OR OLD FIELD [2]	☐ ☐-URBAN OR INDUSTRIAL [0]	☐ ☐-MODERATE [2]	
☐ ☐ -NARROW 5-10 m [2]	☒ ☒-RESIDENTIAL,PARK,NEW FIELD [1]	☐ ☐-OPEN PASTURE,ROWCROP [0]	☐ ☐-HEAVY/SEVERE[1]	
☐ ☒ - VERY NARROW <5 m[1]	☐ ☐-FENCED PASTURE [1]	☐ ☐-MINING/CONSTRUCTION [0]		
☐ ☐ - NONE [0]				

Riparian ☐ Max 10

COMMENTS:

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)
☒ - >1m [6]
☐ - 0.7-1m [4]
☐ - 0.4-0.7m [2]
☐ - 0.2-0.4m [1]
☐ - < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE)
☐ -POOL WIDTH > RIFFLE WIDTH [2]
☒ -POOL WIDTH = RIFFLE WIDTH [1]
☐ -POOL WIDTH< RIFFLE W. [0]

CURRENT VELOCITY [POOLS & RIFFLES!] (Check *All* That Apply)
☐ -EDDIES[1]
☐ -FAST[1]
~~☒ -MODERATE [1]~~
☒ -SLOW [1]
☐ -TORRENTIAL[-1]
☐ -INTERSTITIAL[-1]
☐ -INTERMITTENT[-2]

Pool/ Current ☐ Max 12

COMMENTS:

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE DEPTH
☐ -Best Areas >10 cm [2]
☐ - Best Areas 5-10 cm[1]
☐ - Best Areas < 5 cm
☐ - NO RIFFLE=0]

RUN DEPTH
☐ - MAX > 50 [2]
☒ - MAX < 50[1]

RIFFLE/RUN SUBSTRATE
☐-STABLE (e.g.,Cobble, Boulder) [2]
☒-MOD. STABLE (e.g.,Large Gravel) [1]
☐-UNSTABLE (Fine Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
☐ - NONE [2]
☐ - LOW [1]
☒ - MODERATE [0]
☐ - EXTENSIVE [-1]

Riffle/Run ☐ Max 8

COMMENTS: NO RIFFLE - ONLY SHORT RUN ☐ - NO RIFFLE [Metric=0]

Gradient ☐ Max 10

6] GRADIENT (ft/mi): 4.93 DRAINAGE AREA (sq.mi.): 32

%POOL: 98 %GLIDE: ___
%RIFFLE: ___ %RUN: 2

*Best areas must be large enough to support a population of riffle-obligate fish species.

Is Sampling Reach Representative of the Stream (Y/N) Y If Not, Explain: DIST. END OF EGYPT WETLAND

Major Suspected Sources of Impacts (Check All That Apply):
None ☐
Industrial ☐
WWTP ☐
Ag ☐
Livestock ☐
Silviculture ☐
Construction ☐
Urban Runoff ☐
CSOs ☐
Suburban Impacts ☐
Mining ☐
Channelization ☒
Riparian Removal ☐
Landfills ☐
Natural ☐
Dams ☐
Other Flow Alteration ☐
Other: ☐

	Gear:	Distance:	Water Clarity:	Water Stage:	Canopy -% Open
First Sampling Pass	D	0.22	40	LOW	50

Subjective Rating (1-10) ☐

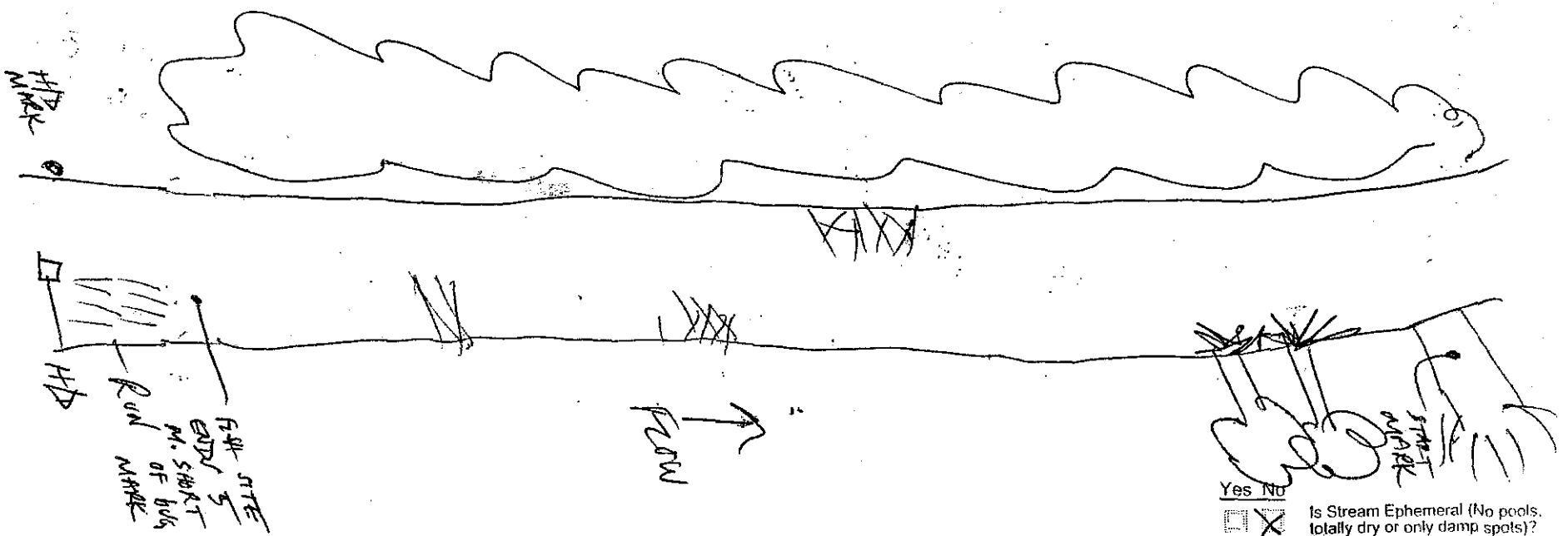
Aesthetic Rating (1-10) ☐

Gradient: ☐ - Low, ☐ - Moderate, ☐ -High

Stream Measurements:

Average Width	Average Depth	Maximum Depth	Av. Bankfull Width	Bankfull Mean Depth	W/D Ratio	Bankfull Max Depth	Floodprone Area Width	Entrench Ratio
14 M	60	110						

Stream Drawing:



Instructions for Scoring the Alternate Cover Metric: Each Cover Type Should Receive a Score of Between 0 and 3, Where: 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

Yes	No	
☐	☒	Is Stream Ephemeral (No pools, totally dry or only damp spots)?
☐	☐	Is There Water Upstream? *How Far:* _____
☐	☐	Is There Water Close Downstream? How Far: _____
☐	☐	Is Dry Channel Mostly Natural?

OhioEPA Qualitative Habitat Evaluation Index Field Sheet QHEI Score: ☐

River Code: 08200 RM: 28.9 Stream M.F. L. BEAVER CR.
Date 071399 Location UPST./DST. SR 165
Scorers Initials: DJA Comments LAT/LONG 40 56 38/80 49 40

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Estimate % present*);

TYPE	POOL	RIFFLE
☐ ☐-BLDR /SLBS[10]	___	___
☐ ☐-BOULDER [9]	___	___
☐ ☐-COBBLE [8]	___	___
☐ ☐-HARDPAN [4]	___	___
☐ ☐-MUCK [2]	✓	___
☐ ☐-SILT [2]	___	___

	POOL	RIFFLE
☐ ☐-GRAVEL [7]	___	✓
☒ ☒-SAND [6]	___	✓
☐ ☐-BEDROCK[5]	___	___
☐ ☐-DETRITUS[3]	___	✓
☐ ☐-ARTIFICIAL[0]	___	___

SUBSTRATE ORIGIN — Check ONE (OR 2 & AVERAGE)
☐ -LIMESTONE [1]
☒ -TILLS [1]
☐ -WETLANDS[0]
☐ -HARDPAN [0]
☐ -SANDSTONE [0]
☐ -RIP/RAP [0]
☐ -LACUSTRINE [0]
☐ -SHALE [-1]
☐ -COAL FINES [-2]

SILT:
EMBEDDEDNESS:

SUBSTRATE QUALITY — Check ONE (OR 2 & AVERAGE)
☐ -SILT HEAVY [-2]
☒ -SILT MODERATE [-1]
☐ -SILT NORMAL [0]
☐ -SILT FREE [1]
☒ -EXTENSIVE [-2]
☐ -MODERATE [-1]
☐ -NORMAL [0]
☐ -NONE [1]

Substrate ☐ Max 20

NOTE: (Ignore sludge originating from point-sources; score on natural substrates)
NUMBER OF SUBSTRATE TYPES: ☐ 5 or More [2] ☒ 4 or Less [0]
COMMENTS:

2] INSTREAM COVER (see back for instructions for additional cover scoring method)

TYPE: (Check *All* That Apply)
☒ 1 UNDERCUT BANKS [1]
☒ 1 OVERHANGING VEGETATION [1]
☒ 1 SHALLOWS (IN SLOW WATER) [1]
☒ 1 ROOTMATS [1]
☒ 1 POOLS> 70 cm [2]
☒ 1 ROOTWADS [1]
☐ ___ BOULDERS [1]
☐ ___ OXBOWS, BACKWATERS [1]
☐ ___ AQUATIC MACROPHYTES [1]
☒ 1 LOGS OR WOODY DEBRIS [1]

AMOUNT: (Check *ONLY* One or check 2 and *AVERAGE*)
☐ - EXTENSIVE > 75% [11]
☒ - MODERATE 25-75% [7]
☒ - SPARSE 5-25% [3]
☐ - NEARLY ABSENT < 5%[1]

Cover ☐ Max 20

COMMENTS:

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY
☐ - HIGH [4]
☐ - MODERATE [3]
☐ - LOW [2]
☒ - NONE [1]

DEVELOPMENT
☐ - EXCELLENT [7]
☐ - GOOD [5]
☒ - FAIR [3]
☐ - POOR [1]

CHANNELIZATION
☐ - NONE [6]
☐ - RECOVERED [4]
☒ - RECOVERING [3]
☒ - RECENT OR NO RECOVERY [1]

STABILITY
☐ - HIGH [3]
☒ - MODERATE [2]
☒ - LOW [1]

MODIFICATIONS/OTHER
☐ - SNAGGING
☐ - RELOCATION
☐ - CANOPY REMOVAL
☒ - DREDGING
☐ - ONE SIDE CHANNEL MODIFICATIONS
☐ - IMPOUND.
☐ - ISLANDS
☐ - LEVEED
☐ - BANK SHAPING

Channel ☐ Max 20

COMMENTS:

4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH (L R Per Bank)
☐ ☐ - WIDE > 50m [4]
☐ ☐ - MODERATE 10-50m [3]
☒ ☒ - NARROW 5-10 m [2]
☐ ☐ - VERY NARROW <5 m[1]
☐ ☐ - NONE [0]

FLOOD PLAIN QUALITY (*PAST 100 Meter RIPARIAN*) (L R Most Predominant Per Bank)
☐ ☐ -FOREST, SWAMP [3]
☐ ☐ -SHRUB OR OLD FIELD [2]
☐ ☐ -RESIDENTIAL,PARK,NEW FIELD [1]
☐ ☐ -FENCED PASTURE [1]
☐ ☐ -CONSERVATION TILLAGE [1]
☐ ☐ -URBAN OR INDUSTRIAL [0]
☒ ☒ -OPEN PASTURE,ROWCROP [0]
☐ ☐ -MINING/CONSTRUCTION [0]

BANK EROSION (L R Per Bank)
☒ ☒ -NONE/LITTLE [3]
☒ ☒ -MODERATE [2]
☐ ☐ -HEAVY/SEVERE[1]

Riparian ☐ Max 10

COMMENTS:

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)
☒ - >1m [6]
☐ - 0.7-1m [4]
☐ - 0.4-0.7m [2]
☐ - 0.2-0.4m [1]
☐ - < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE)
☐ -POOL WIDTH > RIFFLE WIDTH [2]
☒ -POOL WIDTH = RIFFLE WIDTH [1]
☐ -POOL WIDTH< RIFFLE W. [0]

CURRENT VELOCITY [POOLS & RIFFLES!] (Check *All* That Apply)
☐ -EDDIES[1]
☐ -FAST[1]
☒ -MODERATE [1]
☒ -SLOW [1]
☐ -TORRENTIAL[-1]
☐ -INTERSTITIAL[-1]
☐ -INTERMITTENT[-2]

Pool/ Current ☐ Max 12

COMMENTS:

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE DEPTH
☐ - Best Areas >10 cm [2]
☒ - Best Areas 5-10 cm[1]
☐ - Best Areas < 5 cm [RIFFLE=0]

RUN DEPTH
☐ - MAX > 50 [2]
☒ - MAX < 50[1]

RIFFLE/RUN SUBSTRATE
☐ -STABLE (e.g.,Cobble, Boulder) [2]
☐ -MOD. STABLE (e.g.,Large Gravel) [1]
☒ -UNSTABLE (Fine Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
☐ - NONE [2]
☐ - LOW [1]
☐ - MODERATE [0]
☒ - EXTENSIVE [-1]

☐ - NO RIFFLE [Metric=0]

Riffle/Run ☐ Max 8

Gradient ☐ Max 10

COMMENTS:

6] GRADIENT (ft/mi): 3.74 DRAINAGE AREA (sq.mi.): 26

%POOL: 90 %GLIDE: 5
%RIFFLE: %RUN: 5

*Best areas must be large enough to support a population of riffle-obligate fish species.

Is Sampling Reach Representative of the Stream (Y/N) Y If Not, Explain: OLD WETLAND AREA

Major Suspected Sources of Impacts (Check All That Apply):
None ☐
Industrial ☐
WWTP ☐
Ag ☐
Livestock ☐
Silviculture ☐
Construction ☐
Urban Runoff ☐
CSOs ☐
Suburban Impacts ☐
Mining ☐
Channelization ☒
Riparian Removal ☐
Landfills ☐
Natural ☐
Dams ☐
Other Flow Alteration ☐
Other: ☐

	Gear:	Distance:	Water Clarity:	Water Stage:	Canopy -% Open
First Sampling Pass	D	0.20	>40	LOW	70

Subjective Rating (1-10) ☐

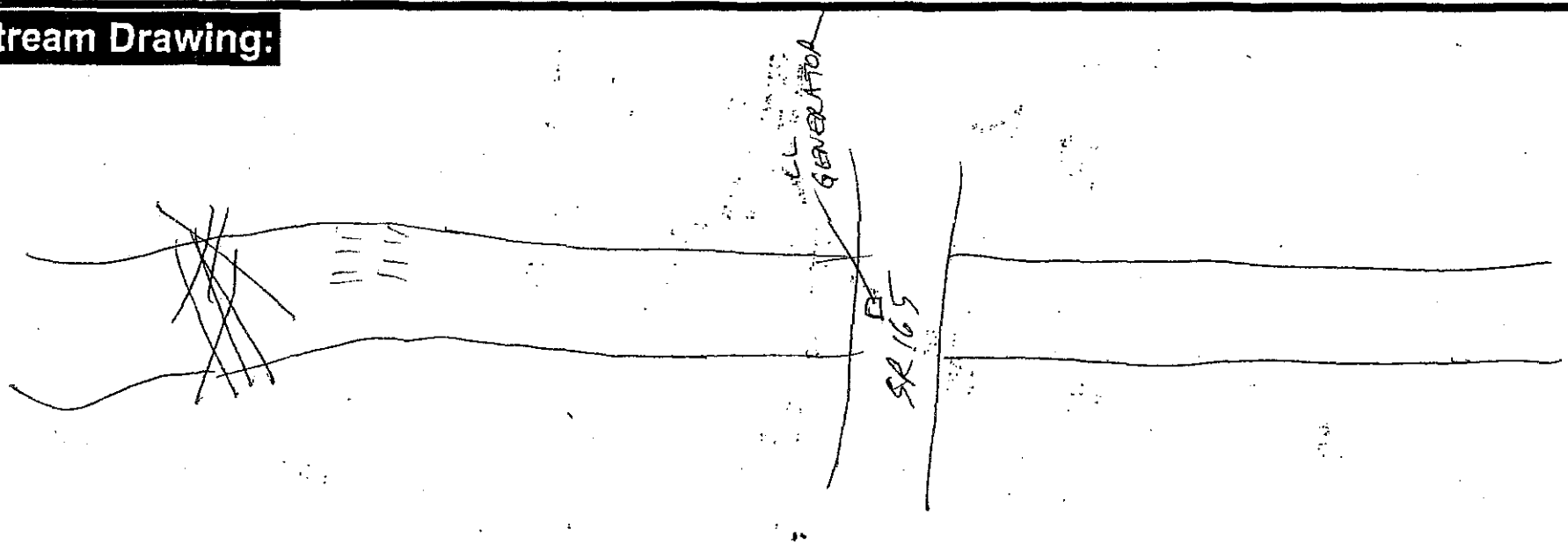
Aesthetic Rating (1-10) ☐

Gradient: ☐ - Low, ☐ - Moderate, ☐ -High

Stream Measurements:

Average Width	Average Depth	Maximum Depth	Av. Bankfull Width	Bankfull Mean Depth	W/D Ratio	Bankfull Max Depth	Floodprone Area Width	Entrench Ratio
10 M	60 cm	110 cm						

Stream Drawing:



Yes	No	
☐	☒	Is Stream Ephemeral (No pools, totally dry or only damp spots)?
☐	☐	Is There Water Upstream? How Far: ____
☐	☐	Is There Water Close Downstream? How Far: ____
☐	☐	Is Dry Channel Mostly Natural?

Instructions for Scoring the Alternate Cover Metric: Each Cover Type Should Receive a Score of Between 0 and 3, Where: 0 - Cover type *absent*; 1 - Cover type *present* in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

OhioEPA Qualitative Habitat Evaluation Index Field Sheet QHEI Score: ____

River Code: 08-200 RM: 32.0 Stream M.F. LITTLE BEAVER CR.
Date 07/13/99 Location UPST. SR 45
Scorers Initials: DJA Comments LAT/LONG : 40 58 06/80 51 25

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE* BOXES; Estimate % present);

TYPE	POOL	RIFFLE		POOL	RIFFLE
☐☐-BLDR /SLBS[10]	___	___	☒☐-GRAVEL [7]	___	✓
☐☐-BOULDER [9]	___	✓	☒☐-SAND [6]	___	✓
☐☐-COBBLE [8]	___	✓	☐☐-BEDROCK[5]	___	___
☐☐-HARDPAN [4]	___	___	☐☐-DETRITUS[3]	___	✓
☐☐-MUCK [2]	___	___	☐☐-ARTIFICIAL[0]	___	___
☐☐-SILT [2]	___	___			

NOTE: (Ignore sludge originating from point-sources; score on natural substrates)
NUMBER OF SUBSTRATE TYPES: ☒-5 or More [2] ☐-4 or Less [0]

SUBSTRATE ORIGIN — Check ONE (OR 2 & AVERAGE)
☐ -LIMESTONE [1]
☒ -TILLS [1]
☐ -WETLANDS[0]
☐ -HARDPAN [0]
☐ -SANDSTONE [0]
☐ -RIP/RAP [0]
☐ -LACUSTRINE [0]
☐ -SHALE [-1]
☐ -COAL FINES [-2]

SILT:
☐ -SILT HEAVY [-2]
☒ -SILT MODERATE [-1]
☐ -SILT NORMAL [0]
☐ -SILT FREE [1]

EMBEDDEDNESS:
☐ -EXTENSIVE [-2]
☒ -MODERATE [-1]
☐ -NORMAL [0]
☐ -NONE [1]

SUBSTRATE QUALITY — Check ONE (OR 2 & AVERAGE)

Substrate ____ Max 20

COMMENTS: ____

2] INSTREAM COVER (see back for instructions for additional cover scoring method)

TYPE: (Check *All* That Apply)
☒ 1 UNDERCUT BANKS [1]
☒ 1 OVERHANGING VEGETATION [1]
☒ 2 SHALLOWS (IN SLOW WATER) [1]
☐ ___ ROOTMATS [1]
☐ ___ POOLS> 70 cm [2]
☒ 1 ROOTWADS [1]
☒ 1 BOULDERS [1]
☐ ___ OXBOWS, BACKWATERS [1]
☐ ___ AQUATIC MACROPHYTES [1]
☒ 2 LOGS OR WOODY DEBRIS [1]

AMOUNT: (Check *ONLY* One or check 2 and *AVERAGE*)
☐ - EXTENSIVE > 75% [11]
☒ - MODERATE 25-75% [7]
☐ - SPARSE 5-25% [3]
☐ - NEARLY ABSENT < 5% [1]

COMMENTS: ____

Cover ____ Max 20

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY
☐ - HIGH [4]
☒ - MODERATE [3]
☐ - LOW [2]
☐ - NONE [1]

DEVELOPMENT
☐ - EXCELLENT [7]
☒ - GOOD [5]
☒ - FAIR [3]
☐ - POOR [1]

CHANNELIZATION
☒ - NONE [6]
☐ - RECOVERED [4]
☐ - RECOVERING [3]
☐ - RECENT OR NO RECOVERY [1]

STABILITY
☐ - HIGH [3]
☒ - MODERATE [2]
☐ - LOW [1]

MODIFICATIONS/OTHER
☐ - SNAGGING
☐ - RELOCATION
☒ - CANOPY REMOVAL
☐ - DREDGING
☐ - ONE SIDE CHANNEL MODIFICATIONS
☐ - IMPOUND.
☐ - ISLANDS
☐ - LEVEED
☐ - BANK SHAPING

Channel ____ Max 20

COMMENTS: ____

4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH (L R (Per Bank))
☐☐ - WIDE > 50m [4]
☒☐ - MODERATE 10-50m [3]
☒☒ - NARROW 5-10 m [2]
☐☐ - VERY NARROW <5 m [1]
☐☒ - NONE [0]

FLOOD PLAIN QUALITY (*PAST 100 Meter RIPARIAN*) (L R (Most Predominant Per Bank))
☐☐ - FOREST, SWAMP [3]
☐☐ - SHRUB OR OLD FIELD [2]
☒☐ - RESIDENTIAL, PARK, NEW FIELD [1]
☐☐ - FENCED PASTURE [1]
☐☐ - CONSERVATION TILLAGE [1]
☐☐ - URBAN OR INDUSTRIAL [0]
☐☒ - OPEN PASTURE, ROWCROP [0]
☐☐ - MINING/CONSTRUCTION [0]

BANK EROSION (L R (Per Bank))
☒☐ - NONE/LITTLE [3]
☐☐ - MODERATE [2]
☐☒ - HEAVY/SEVERE [1]

Riparian ____ Max 10

COMMENTS: ____

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)
☐ - >1m [6]
☐ - 0.7-1m [4]
☒ - 0.4-0.7m [2]
☐ - 0.2-0.4m [1]
☐ - < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE)
☒ - POOL WIDTH > RIFFLE WIDTH [2]
☐ - POOL WIDTH = RIFFLE WIDTH [1]
☐ - POOL WIDTH < RIFFLE W. [0]

CURRENT VELOCITY [POOLS & RIFFLES!] (Check *All* That Apply)
☐ - EDDIES [1]
☒ - FAST [1]
☒ - MODERATE [1]
☐ - SLOW [1]
☐ - TORRENTIAL [-1]
☐ - INTERSTITIAL [-1]
☐ - INTERMITTENT [-2]

Pool/ Current ____ Max 12

COMMENTS: ____

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE DEPTH
☒ - *Best Areas >10 cm [2]
☐ - Best Areas 5-10 cm [1]
☐ - Best Areas < 5 cm [RIFFLE=0]

RUN DEPTH
☐ - MAX > 50 [2]
☒ - MAX < 50 [1]

RIFFLE/RUN SUBSTRATE
☐ - STABLE (e.g., Cobble, Boulder) [2]
☒ - MOD. STABLE (e.g., Large Gravel) [1]
☐ - UNSTABLE (Fine Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
☐ - NONE [2]
☐ - LOW [1]
☒ - MODERATE [0]
☐ - EXTENSIVE [-1]

☐ - NO RIFFLE [Metric=0]

Riffle/Run ____ Max 8

Gradient ____ Max 10

COMMENTS: ____

6] GRADIENT (ft/mi): 6.25 DRAINAGE AREA (sq.mi.): 18.9

%POOL: 50 %GLIDE: 20
%RIFFLE: 20 %RUN: 10

*Best areas must be large enough to support a population of riffle-obligate fish species.

Is Sampling Reach Representative of the Stream (Y/N) Y If Not, Explain: _____

Major Suspected Sources of Impacts (Check All That Apply):
None ☐
Industrial ☐
WWTP ☒
Ag ☐
Livestock ☐
Silviculture ☐
Construction ☐
Urban Runoff ☐
CSOs ☐
Suburban Impacts ☐
Mining ☐
Channelization ☐
Riparian Removal ☐
Landfills ☐
Natural ☐
Dams ☐
Other Flow Alteration ☐
Other: _____ ☐

	Gear:	Distance:	Water Clarity:	Water Stage:	Canopy -% Open
First Sampling Pass	D	0.20 KM	>60	LOW	60

Subjective Rating (1-10) ☐

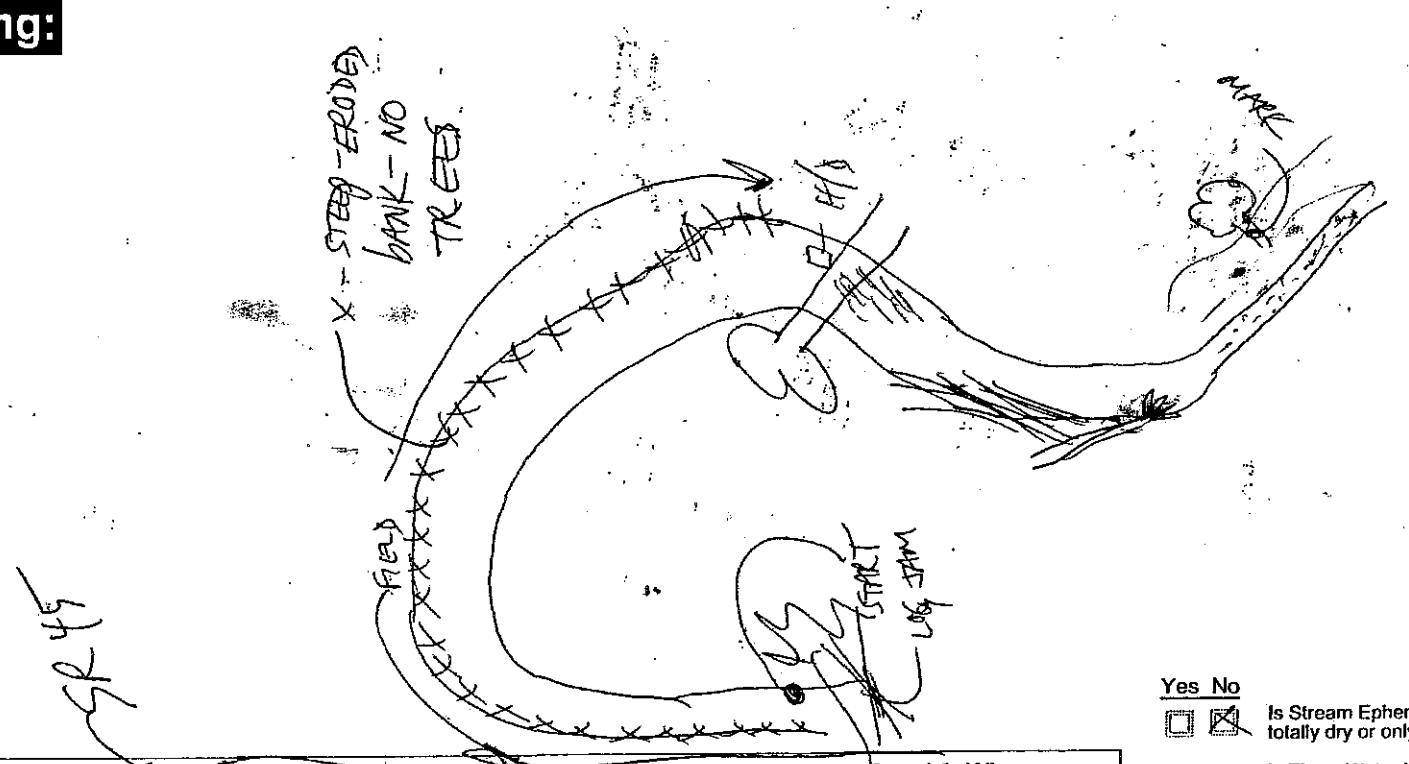
Aesthetic Rating (1-10) ☐

Gradient: ☐ - Low, ☐ - Moderate, ☐ -High

Stream Measurements:

Average Width	Average Depth	Maximum Depth	Av. Bankfull Width	Bankfull Mean Depth	W/D Ratio	Bankfull Max Depth	Floodprone Area Width	Entrench. Ratio
8M	40	60						

Stream Drawing:



Instructions for Scoring the Alternate Cover Metric: Each Cover Type Should Receive a Score of Between 0 and 3, Where: 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

Yes	No	
☐	☒	Is Stream Ephemeral (No pools, totally dry or only damp spots)?
☐	☐	Is There Water Upstream? How Far: _____
☐	☐	Is There Water Close Downstream? How Far: _____
☐	☐	Is Dry Channel Mostly Natural?

OhioEPA Qualitative Habitat Evaluation Index Field Sheet QHEI Score: ☐

River Code: 08-200 RM: 33.3 Stream M. F. LITTLE BEAVER CR.
Date 071399 Location MIDDLETOWN RD. - UPST.
Scorers Initials: DJA Comments LAT/LONG: 40 57 30 / 80 51 52

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Estimate % present*);

TYPE	POOL	RIFFLE
☐ ☐-BLDR /SLBS[10]	___	___
☐ ☐-BOULDER [9]	✓	___
☒ ☐-COBBLE [8]	___	✓
☐ ☐-HARDPAN [4]	___	___
☐ ☐-MUCK [2]	___	___
☐ ☐-SILT [2]	___	✓
☒ ☐-GRAVEL [7]	___	✓
☐ ☐-SAND [6]	___	___
☐ ☐-BEDROCK[5]	___	___
☐ ☐-DETRITUS[3]	___	✓
☐ ☐-ARTIFICIAL[0]	___	___

NOTE: (Ignore sludge originating from point-sources; score on natural substrates)
NUMBER OF SUBSTRATE TYPES: ☒-5 or More [2] ☐-4 or Less [0]

SUBSTRATE ORIGIN — Check ONE (OR 2 & AVERAGE)
☐-LIMESTONE [1]
☒-TILLS [1]
☐-WETLANDS[0]
☐-HARDPAN [0]
☐-SANDSTONE [0]
☐-RIP/RAP [0]
☐-LACUSTRINE [0]
☐-SHALE [-1]
☐-COAL FINES [-2]

SUBSTRATE QUALITY — Check ONE (OR 2 & AVERAGE)
SILT:
☐-SILT HEAVY [-2]
☒-SILT MODERATE [-1]
☐-SILT NORMAL [0]
☐-SILT FREE [1]
EMBEDDEDNESS:
☐-EXTENSIVE [-2]
☒-MODERATE [-1]
☐-NORMAL [0]
☐-NONE [1]

Substrate Max 20

COMMENTS:

2] INSTREAM COVER (see back for instructions for additional cover scoring method)

TYPE: (Check *All* That Apply)
☒ 1 UNDERCUT BANKS [1]
☒ 2 OVERHANGING VEGETATION [1]
☒ 1 SHALLOWS (IN SLOW WATER) [1]
☒ 1 ROOTMATS [1]
☒ 2 POOLS> 70 cm [2]
☒ 1 ROOTWADS [1]
☒ 1 BOULDERS [1]
☐ OXBOWS, BACKWATERS [1]
☐ AQUATIC MACROPHYTES [1]
☒ 2 LOGS OR WOODY DEBRIS [1]

AMOUNT: (Check *ONLY* One or check 2 and *AVERAGE*)
☐ - EXTENSIVE > 75% [11]
☒ - MODERATE 25-75% [7]
☐ - SPARSE 5-25% [3]
☐ - NEARLY ABSENT < 5% [1]

Cover Max 20

COMMENTS:

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY
☐ - HIGH [4]
☒ - MODERATE [3]
☐ - LOW [2]
☐ - NONE [1]

DEVELOPMENT
☐ - EXCELLENT [7]
☒ - GOOD [5]
☐ - FAIR [3]
☐ - POOR [1]

CHANNELIZATION
☒ - NONE [6]
☐ - RECOVERED [4]
☐ - RECOVERING [3]
☐ - RECENT OR NO RECOVERY [1]

STABILITY
☐ - HIGH [3]
☒ - MODERATE [2]
☐ - LOW [1]

MODIFICATIONS/OTHER
☐ - SNAGGING
☐ - RELOCATION
☐ - CANOPY REMOVAL
☐ - DREDGING
☐ - ONE SIDE CHANNEL MODIFICATIONS
☐ - IMPOUND,
☐ - ISLANDS
☐ - LEVEED
☐ - BANK SHAPING

Channel Max 20

COMMENTS:

4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH — L R (Per Bank)
☒ ☒ -WIDE > 50m [4]
☐ ☐ - MODERATE 10-50m [3]
☐ ☐ -NARROW 5-10 m [2]
☐ ☐ - VERY NARROW <5 m[1]
☐ ☐ - NONE [0]

FLOOD PLAIN QUALITY (*PAST 100 Meter RIPARIAN*) — L R (Most Predominant Per Bank)
☒ ☒-FOREST, SWAMP [3]
☐ ☐-SHRUB OR OLD FIELD [2]
☐ ☐-RESIDENTIAL,PARK,NEW FIELD [1]
☐ ☐-FENCED PASTURE [1]
☐ ☐-CONSERVATION TILLAGE [1]
☐ ☐-URBAN OR INDUSTRIAL [0]
☐ ☐-OPEN PASTURE,ROWCROP [0]
☐ ☐-MINING/CONSTRUCTION [0]

BANK EROSION — L R (Per Bank)
☒ ☒-NONE/LITTLE [3]
☐ ☐-MODERATE [2]
☐ ☐-HEAVY/SEVERE[1]

Riparian Max 10

COMMENTS:

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)
☒ - >1m [6]
☐ - 0.7-1m [4]
☐ - 0.4-0.7m [2]
☐ - 0.2-0.4m [1]
☐ - < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE)
☒ -POOL WIDTH > RIFFLE WIDTH [2]
☐ -POOL WIDTH = RIFFLE WIDTH [1]
☐ -POOL WIDTH< RIFFLE W. [0]

CURRENT VELOCITY [POOLS & RIFFLES!] (Check *All* That Apply)
☐ -EDDIES[1]
☒ -FAST[1]
☒ -MODERATE [1]
☒ -SLOW [1]
☐ -TORRENTIAL[-1]
☐ -INTERSTITIAL[-1]
☐ -INTERMITTENT[-2]

Pool/ Current Max 12

COMMENTS:

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE DEPTH
☒ -Best Areas >10 cm [2]
☐ - Best Areas 5-10 cm[1]
☐ - Best Areas < 5 cm [RIFFLE=0]

RUN DEPTH
☒ - MAX > 50 [2]
☐ - MAX < 50[1]

RIFFLE/RUN SUBSTRATE
☒ STABLE (e.g., Cobble, Boulder) [2]
☒ MOD. STABLE (e.g., Large Gravel) [1]
☐ UNSTABLE (Fine Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
☐ - NONE [2]
☒ - LOW [1]
☒ - MODERATE [0]
☐ - EXTENSIVE [-1]

☐ - NO RIFFLE [Metric=0]

Riffle/Run Max 8

COMMENTS:

Gradient Max 10

6] GRADIENT (ft/mi): 18.18 DRAINAGE AREA (sq.mi.): 17.9

%POOL: 50 %GLIDE: 10
%RIFFLE: 20 %RUN: 20

*Best areas must be large enough to support a population of riffle-obligate fish species.

EPA 4520 7/16/98

Is Sampling Reach Representative of the Stream (Y/N) Y If Not, Explain: _____

Major Suspected Sources of Impacts (Check All That Apply):
None ☐
Industrial ☐
WWTP ☒
Ag ☐
Livestock ☐
Silviculture ☐
Construction ☐
Urban Runoff ☐
CSOs ☐
Suburban Impacts ☐
Mining ☐
Channelization ☐
Riparian Removal ☐
Landfills ☐
Natural ☐
Dams ☐
Other Flow Alteration ☐
Other: _____ ☐

	Gear:	Distance:	Water Clarity:	Water Stage:	Canopy -% Open
First Sampling Pass	D	0.20	100	LOW	10

Subjective Rating (1-10) ☐

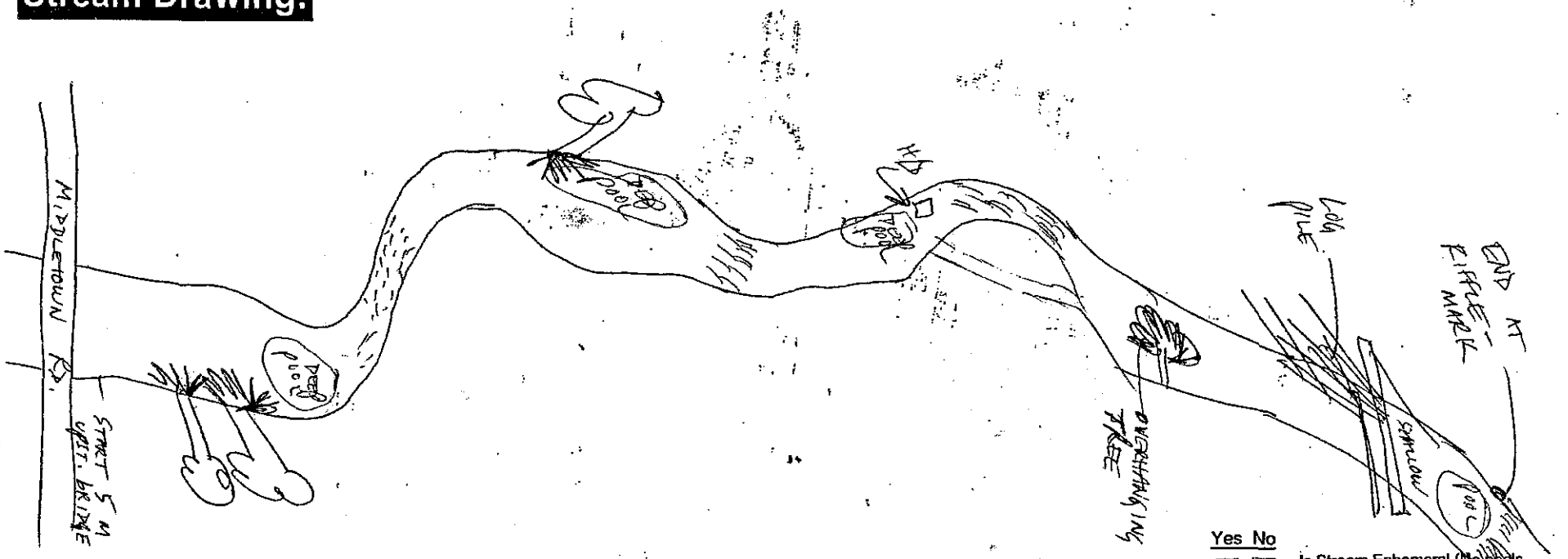
Aesthetic Rating (1-10) ☐

Gradient: ☐ - Low, ☐ - Moderate, ☐ -High

Stream Measurements:

Average Width	Average Depth	Maximum Depth	Av. Bankfull Width	Bankfull Mean Depth	W/D Ratio	Bankfull Max Depth	Floodprone Area Width	Entrench. Ratio
10 M	50 CM	110 CM						

Stream Drawing:



Yes	No	
☐	☒	Is Stream Ephemeral (No pools, totally dry or only damp spots)?
☐	☐	Is There Water Upstream? How Far: _____
☐	☐	Is There Water Close Downstream? How Far: _____
☐	☐	Is Dry Channel Mostly Natural?

Instructions for Scoring the Alternate Cover Metric: Each Cover Type Should Receive a Score of Between 0 and 3, Where: 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

OhioEPA Qualitative Habitat Evaluation Index Field Sheet QHEI Score: ☐

River Code: 08-200 RM: 36.7 Stream M.F. LITTLE BEAVER CR.
Date 071399 Location UPST./DST. PINE LAKE RD.
Scorers Initials: DJA Comments LAT/LONG: 40 55 06/80 53 07

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Estimate % present*);

TYPE	POOL	RIFFLE
☐☐-BLDR /SLBS[10]	___	___
☐☐-BOULDER [9]	___	___
☐☐-COBBLE [8]	✓	✓
☐☐-HARDPAN [4]	___	___
☐☐-MUCK [2]	___	___
☐☐-SILT [2]	✓	___
☒☐-GRAVEL [7]	✓	✓
☒☐-SAND [6]	✓	___
☐☐-BEDROCK[5]	___	___
☐☐-DETRITUS[3]	✓	___
☐☐-ARTIFICIAL[0]	___	___

NOTE: (Ignore sludge originating from point-sources; score on natural substrates)

NUMBER OF SUBSTRATE TYPES: ☐-4 or Less [0] ☒-5 or More [2]

SUBSTRATE ORIGIN: Check ONE (OR 2 & AVERAGE)
☐ -LIMESTONE [1]
☒ -TILLS [1]
☐ -WETLANDS[0]
☐ -HARDPAN [0]
☐ -SANDSTONE [0]
☐ -RIP/RAP [0]
☐ -LACUSTRINE [0]
☐ -SHALE [-1]
☐ -COAL FINES [-2]

SILT: Check ONE (OR 2 & AVERAGE)
☐ -SILT HEAVY [-2]
☒ -SILT MODERATE [-1]
☐ -SILT NORMAL [0]
☐ -SILT FREE [1]

EMBEDDEDNESS:
☒ -EXTENSIVE [-2]
☐ -MODERATE [-1]
☐ -NORMAL [0]
☐ -NONE [1]

Substrate ☐ Max 20

COMMENTS:

2] INSTREAM COVER (see back for instructions for additional cover scoring method)

TYPE: (Check *All* That Apply)
☒ 1 UNDERCUT BANKS [1]
☒ 2 OVERHANGING VEGETATION [1]
☒ 1 SHALLOWS (IN SLOW WATER) [1]
☒ 1 ROOTMATS [1]
☒ 1 POOLS> 70 cm [2]
☐ ___ ROOTWADS [1]
☐ ___ BOULDERS [1]
☐ ___ OXBOWS, BACKWATERS [1]
☐ ___ AQUATIC MACROPHYTES [1]
☒ 1 LOGS OR WOODY DEBRIS [1]

AMOUNT: (Check *ONLY* One or check 2 and *AVERAGE*)
☐ - EXTENSIVE > 75% [11]
☐ - MODERATE 25-75% [7]
☒ - SPARSE 5-25% [3]
☐ - NEARLY ABSENT < 5% [1]

Cover ☐ Max 20

COMMENTS:

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY
☐ - HIGH [4]
☒ - MODERATE [3]
☒ - LOW [2]
☐ - NONE [1]

DEVELOPMENT
☐ - EXCELLENT [7]
☐ - GOOD [5]
☒ - FAIR [3]
☐ - POOR [1]

CHANNELIZATION
☒ - NONE [6]
☐ - RECOVERED [4]
☐ - RECOVERING [3]
☐ - RECENT OR NO RECOVERY [1]

STABILITY
☐ - HIGH [3]
☒ - MODERATE [2]
☒ - LOW [1]

MODIFICATIONS/OTHER
☐ - SNAGGING
☐ - RELOCATION
☒ - CANOPY REMOVAL
☐ - DREDGING
☐ - ONE SIDE CHANNEL MODIFICATIONS
☐ - IMPOUND.
☐ - ISLANDS
☐ - LEVEED
☐ - BANK SHAPING

SOME ≈ 40 m

Channel ☐ Max 20

COMMENTS:

4]. RIPARIAN ZONE AND BANK EROSION (check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH (L R Per Bank)
☐☐-WIDE > 50m [4]
☐☐ - MODERATE 10-50m [3]
☒☒-NARROW 5-10 m [2]
☐☐ - VERY NARROW <5 m[1]
☐☐ - NONE [0]

FLOOD PLAIN QUALITY (*PAST 100 Meter RIPARIAM*) (L R Most Predominant Per Bank)
☒☐-FOREST, SWAMP [3]
☐☒-SHRUB OR OLD FIELD [2]
☒☒-RESIDENTIAL, PARK, NEW FIELD [1]
☐☐-FENCED PASTURE [1]
☐☐-CONSERVATION TILLAGE [1]
☐☐-URBAN OR INDUSTRIAL [0]
☐☐-OPEN PASTURE, ROWCROP [0]
☐☐-MINING/CONSTRUCTION [0]

BANK EROSION (L R Per Bank)
☒☒-NONE/LITTLE [3]
☐☐-MODERATE [2]
☐☐-HEAVY/SEVERE [1]

Riparian ☐ Max 10

COMMENTS:

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)
☐ - >1m [6]
☒ - 0.7-1m [4]
☐ - 0.4-0.7m [2]
☐ - 0.2- 0.4m [1]
☐ - < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE)
☒ -POOL WIDTH > RIFFLE WIDTH [2]
☐ -POOL WIDTH = RIFFLE WIDTH [1]
☐ -POOL WIDTH< RIFFLE W. [0]

CURRENT VELOCITY [POOLS & RIFFLES!] (Check *All* That Apply)
☐ -EDDIES[1]
☐ -FAST[1]
☒ -MODERATE [1]
☒ -SLOW [1]
☐ -TORRENTIAL[-1]
☐ -INTERSTITIAL[-1]
☐ -INTERMITTENT[-2]

Pool/ Current ☐ Max 12

COMMENTS:

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE DEPTH
☐ -*Best Areas >10 cm [2]
☒ - Best Areas 5-10 cm[1]
☐ - Best Areas < 5 cm [RIFFLE=0]

RUN DEPTH
☐ - MAX > 50 [2]
☒ - MAX < 50[1]

RIFFLE/RUN SUBSTRATE
☒ -STABLE (e.g., Cobble, Boulder) [2]
☒ -MOD. STABLE (e.g., Large Gravel) [1]
☐ -UNSTABLE (Fine Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
☐ - NONE [2]
☐ - LOW [1]
☐ - MODERATE [0]
☒ - EXTENSIVE [-1]

☐ - NO RIFFLE [Metric=0]

Riffle/Run ☐ Max 8
Gradient ☐ Max 10

COMMENTS:

6] GRADIENT (ft/mi): 13.89 DRAINAGE AREA (sq.mi.): 8.3

%POOL: 55 %GLIDE: 20
%RIFFLE: 15 %RUN: 10

*Best areas must be large enough to support a population of riffle-obligate fish species.

Is Sampling Reach Representative of the Stream (Y/N) Y If Not, Explain:
ONLY MINOR SLUDGE DEPOSITS ALONG MARGINS

Major Suspected Sources of Impacts (Check All That Apply):
None ☐
Industrial ☐
WWTP ☒
Ag ☐
Livestock ☐
Silviculture ☐
Construction ☐
Urban Runoff ☐
CSOs ☐
Suburban Impacts ☐
Mining ☐
Channelization ☐
Riparian Removal ☐
Landfills ☐
Natural ☐
Dams ☐
Other Flow Alteration ☐
Other: MIREX AREA ☒

	Gear:	Distance:	Water Clarity:	Water Stage:	Canopy -% Open
First Sampling Pass	D	0.20 KM	>75	LOW	25

Subjective Rating (1-10) ☐

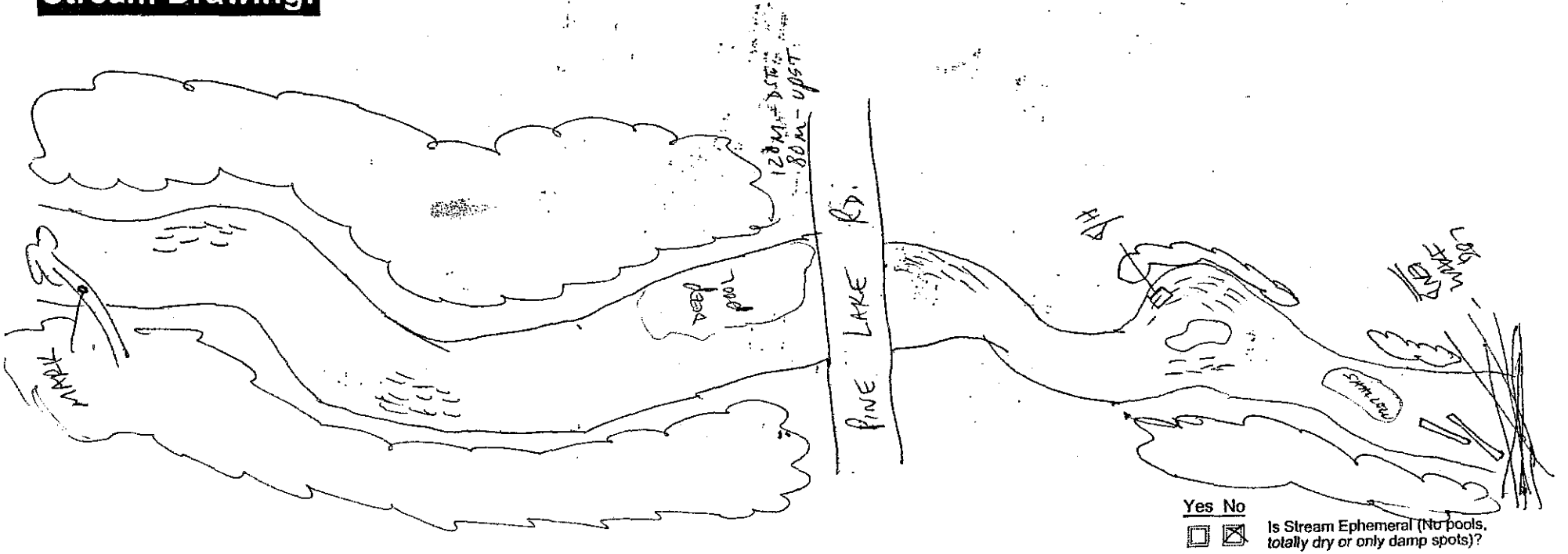
Aesthetic Rating (1-10) ☐

Gradient: ☐ - Low, ☐ - Moderate, ☐ -High

Stream Measurements:

Average Width	Average Depth	Maximum Depth	Av. Bankfull Width	Bankfull Mean Depth	W/D Ratio	Bankfull Max Depth	Floodprone Area Width	Entrench Ratio
7 M	30 CM	75 CM						

Stream Drawing:



Yes	No	
☐	☒	Is Stream Ephemeral (No pools, *totally dry or only damp spots*)?
☒	☐	Is There Water Upstream? How Far: ____
☒	☐	Is There Water Close Downstream? How Far: ____
☒	☐	Is Dry Channel Mostly Natural?

Instructions for Scoring the Alternate Cover Metric: Each Cover Type Should Receive a Score of Between 0 and 3, Where: 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or *in small amounts of highest quality*; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

Ohio EPA Qualitative Habitat Evaluation Index Field Sheet QHEI Score: ____

River Code: 08-200 RM: 37.7 Stream M.F. LITTLE BEAVER CR.
Date 071299 Location WEST ALLEN RD.
Scorers Initials: DJA Comments SEWAGE ODOR / SEWAGE SLUDGE

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Estimate % present*);

TYPE	POOL	RIFFLE
☐ ☐-BLDR /SLBS[10]	___	___
☐ ☐-BOULDER [9]	✓	___
☐ ☐-COBBLE [8]	✓	___
☐ ☐-HARDPAN [4]	___	___
☐ ☐-MUCK [2]	___	___
☐ ☐-SILT [2]	✓	___
☒ ☐-GRAVEL [7]	✓	___
☒ ☐-SAND [6]	✓	___
☐ ☐-BEDROCK[5]	___	___
☐ ☐-DETRITUS[3]	___	___
☐ ☐-ARTIFICIAL[0]	___	___

NOTE: (Ignore sludge originating from point-sources; score on natural substrates)
NUMBER OF SUBSTRATE TYPES: ☒-5 or More [2] ☐-4 or Less [0]
COMMENTS LOTS OF SLUDGE IN MARGINS

SUBSTRATE ORIGIN: Check ONE (OR 2 & AVERAGE)
☐ -LIMESTONE [1]
☒ -TILLS [1]
☐ -WETLANDS[0]
☐ -HARDPAN [0]
☐ -SANDSTONE [0]
☐ -RIP/RAP [0]
☐ -LACUSTRINE [0]
☐ -SHALE [-1]
☐-COAL FINES [-2]

SILT: EMBEDDEDNESS:

SUBSTRATE QUALITY: Check ONE (OR 2 & AVERAGE)
☒ -SILT HEAVY [-2]
☒ -SILT MODERATE [-1]
☐ -SILT NORMAL [0]
☐ -SILT FREE [1]
☒ -EXTENSIVE [-2]
☒ -MODERATE [-1]
☐ -NORMAL [0]
☐ -NONE [1]

Substrate ____ Max 20

2] INSTREAM COVER (see back for instructions for additional cover scoring method)

TYPE: (Check *All* That Apply)
☒ 2 UNDERCUT BANKS [1]
☒ 1 OVERHANGING VEGETATION [1]
☒ 1 SHALLOWS (IN SLOW WATER) [1]
☒ 2 ROOTMATS [1]
☒ 2 POOLS> 70 cm [2]
☒ 1 ROOTWADS [1]
☒ 1 BOULDERS [1]
☐ ___ OXBOWS, BACKWATERS [1]
☐ ___ AQUATIC MACROPHYTES [1]
☒ 1 LOGS OR WOODY DEBRIS [1]
COMMENTS: ____

AMOUNT: (Check *ONLY* One or check 2 and *AVERAGE*)
☐ - EXTENSIVE > 75% [11]
☒ - MODERATE 25-75% [7]
☒ - SPARSE 5-25% [3]
☐ - NEARLY ABSENT < 5%[1]

Cover ____ Max 20

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐ - HIGH [4]	☐ - EXCELLENT [7]	☒ - NONE [6]	☐ - HIGH [3]	☐ - SNAGGING	☐ - IMPOUND.
☒ - MODERATE [3]	☒ - GOOD [5]	☒ - RECOVERED [4]	☒ - MODERATE [2]	☐ - RELOCATION	☐ - ISLANDS
☒ - LOW [2]	☒ - FAIR [3]	☐ - RECOVERING [3]	☒ - LOW [1]	☐ - CANOPY REMOVAL	☐ - LEVEED
☐ - NONE [1]	☐ - POOR [1]	☐ - RECENT OR NO RECOVERY [1]		☐ - DREDGING	☐ - BANK SHAPING
				☐ - ONE SIDE CHANNEL MODIFICATIONS	

Channel ____ Max 20

COMMENTS: LOWER 1/2 OF ZONE HAS THE LOOK OF OLD CHANNELIZATION WITH SOME RECOVE

4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH L R (Per Bank)	FLOOD PLAIN QUALITY (*PAST 100 Meter RIPARIAN*) L R (Most Predominant Per Bank)		BANK EROSION L R (Per Bank)	
☐☐ -WIDE > 50m [4]	☐☐-FOREST, SWAMP [3]	☐☐-CONSERVATION TILLAGE [1]	☒☒-NONE/LITTLE [3]	
☒☒ - MODERATE 10-50m [3]	☒☒-SHRUB OR OLD FIELD [2]	☐☐-URBAN OR INDUSTRIAL [0]	☐☐-MODERATE [2]	
☐☐ -NARROW 5-10 m [2]	☒☒-RESIDENTIAL,PARK,NEW FIELD [1]	☐☐-OPEN PASTURE,ROWCROP [0]	☐☐-HEAVY/SEVERE[1]	
☐☐ - VERY NARROW <5 m[1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]		
☐☐ - NONE [0]				

Riparian ____ Max 10

COMMENTS: ____

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)	MORPHOLOGY (Check 1 or 2 & AVERAGE)	CURRENT VELOCITY (POOLS & RIFFLES) (Check *All* That Apply)	
☐ - >1m [6]	☒ -POOL WIDTH > RIFFLE WIDTH [2]	☐ -EDDIES[1]	☐ -TORRENTIAL[-1]
☒ - 0.7-1m [4]	☐ -POOL WIDTH = RIFFLE WIDTH [1]	☐ -FAST[1]	☐ -INTERSTITIAL[-1]
☐ - 0.4-0.7m [2]	☐ -POOL WIDTH< RIFFLE W. [0]	☒ -MODERATE [1]	☐ -INTERMITTENT[-2]
☐ - 0.2- 0.4m [1]		☒ -SLOW [1]	
☐ - < 0.2m [POOL=0]			

Pool/ Current ____ Max 12

COMMENTS: ____

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE DEPTH	RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
☒ -*Best Areas >10 cm [2]	☐ - MAX > 50 [2]	☐-STABLE (e.g.,Cobble, Boulder) [2]	☐ - NONE [2]
☐ - Best Areas 5-10 cm[1]	☒ - MAX < 50[1]	☒-MOD. STABLE (e.g.,Large Gravel) [1]	☐ - LOW [1]
☐ - Best Areas < 5 cm [RIFFLE=0]		☐-UNSTABLE (Fine Gravel,Sand) [0]	☒ - MODERATE [0]
			☐ - EXTENSIVE [-1]

Riffle/Run ____ Max 8

COMMENTS: ____ ☐ - NO RIFFLE [Metric=0]

Gradient ____ Max 10

6] GRADIENT (ft/mi): 11.76 DRAINAGE AREA (sq.mi.): 6.1

%POOL: 55 %GLIDE: 30
%RIFFLE: 10 %RUN: 5

*Best areas must be large enough to support a population of riffle-obligate fish species.

Is Sampling Reach Representative of the Stream (Y/N) Y If Not, Explain:

HEAVY SILT/SAND BEDLOAD IN STREAM - DST. FROM RECENT CHANNEL WORK UPST. FROM SALEM WWTP.
SEWAGE ODOR IN STREAM + SLUDGE DEPOSITS ALONG STREAM MARGINS.

Major Suspected Sources of Impacts (Check All That Apply):
- None ☐
- Industrial ☐
- WWTP ☒
- Ag ☐
- Livestock ☐
- Silviculture ☐
- Construction ☐
- Urban Runoff ☐
- CSOs ☐
- Suburban Impacts ☐
- Mining ☐
- Channelization ☒
- Riparian Removal ☐
- Landfills ☐
- Natural ☐
- Dams ☐
- Other Flow Alteration ☐
- Other: ☐ (MAYBE OLD)

	Gear:	Distance:	Water Clarity:	Water Stage:	Canopy -% Open
First Sampling Pass	D	0.20 KM	40 CM	LOW	15

Subjective Rating (1-10) ☐

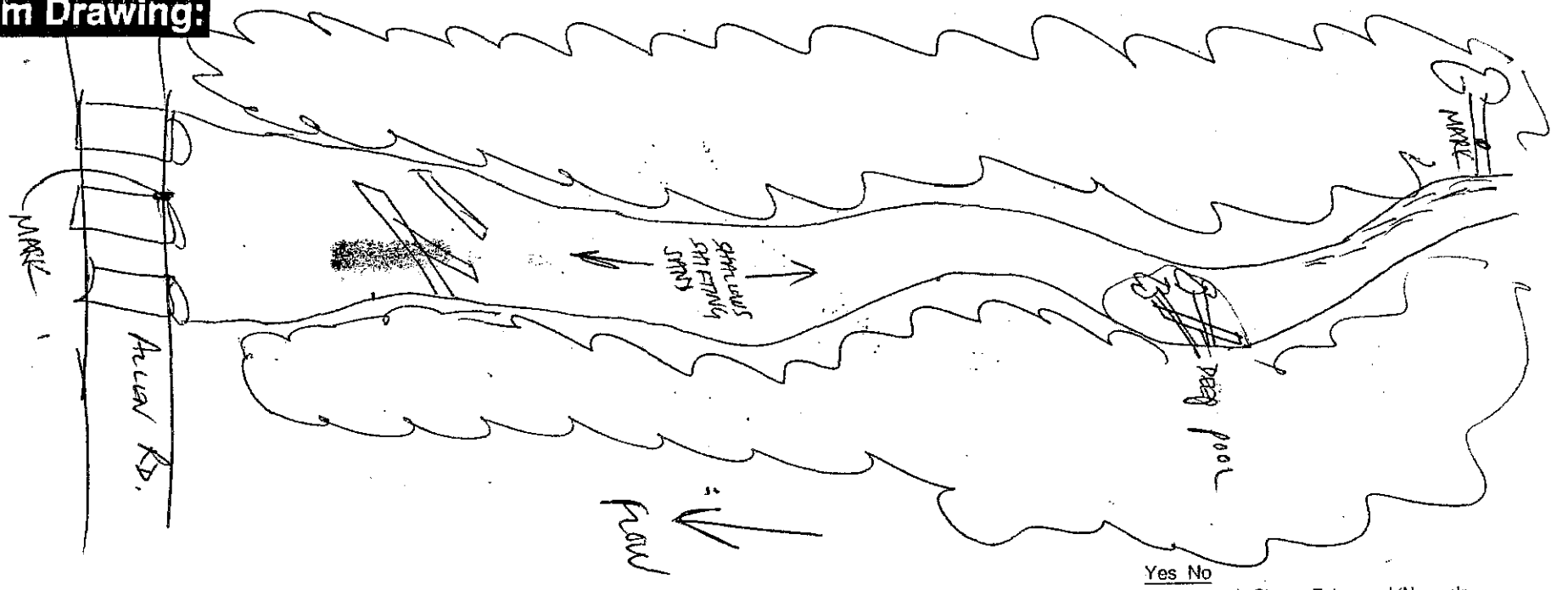
Aesthetic Rating (1-10) ☐

Gradient: ☐ - Low, ☒ - Moderate, ☐ - High

Stream Measurements:

Average Width	Average Depth	Maximum Depth	Av. Bankfull Width	Bankfull Mean Depth	W/D Ratio	Bankfull Max Depth	Floodprone Area Width	Entrench. Ratio
6 M	25 CM	100 CM						

Stream Drawing:



Yes	No	
☐	☒	Is Stream Ephemeral (No pools, totally dry or only damp spots)?
☒	☐	Is There Water Upstream? How Far: _____
☒	☐	Is There Water Close Downstream? How Far: _____
☒	☐	Is Dry Channel Mostly Natural?

Instructions for Scoring the Alternate Cover Metric: Each Cover Type Should Receive a Score of Between 0 and 3, Where: 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

OhioEPA Qualitative Habitat Evaluation Index Field Sheet QHEI Score: ____

River Code: 08-200 RM: 38.2 Stream M.F. LITTLE BEAVER CR.
Date 071299 Location UPST. SALEM WWTP
Scorers Initials: RJA Comments CAT / LONG 40 54 42 / 80 52 48

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Estimate % present*);

TYPE	POOL	RIFFLE
☐ ☐-BLDR /SLBS[10]	___	___
☐ ☐-BOULDER [9]	___	___
☐ ☐-COBBLE [8]	✓	___
☐ ☐-HARDPAN [4]	✓	___
☐ ☐-MUCK [2]	___	___
☐ ☐-SILT [2]	___	___
☒ ☐-GRAVEL [7]	✓	___
☒ ☐-SAND [6]	✓	___
☐ ☐-BEDROCK[5]	___	___
☐ ☐-DETRITUS[3]	✓	___
☐ ☐-ARTIFICIAL[0]	___	___

NOTE: (Ignore sludge originating from point-sources; score on natural substrates)
NUMBER OF SUBSTRATE TYPES: ☒ 5 or More [2] ~~☐ 4 or Less [0]~~

SUBSTRATE ORIGIN — Check ONE (OR 2 & AVERAGE)
☐ -LIMESTONE [1]
☒ -TILLS [1]
☐ -WETLANDS[0]
☐ -HARDPAN [0]
☐ -SANDSTONE [0]
☐ -RIP/RAP [0]
☐ -LACUSTRINE [0]
☐ -SHALE [-1]
☐ -COAL FINES [-2]

SUBSTRATE QUALITY — Check ONE (OR 2 & AVERAGE)
SILT:
☐ -SILT HEAVY [-2]
☒ -SILT MODERATE [-1]
☒ -SILT NORMAL [0]
☐ -SILT FREE [1]
EMBEDDED NESS:
☒ -EXTENSIVE [-2]
☐ -MODERATE [-1]
☐ -NORMAL [0]
☐ -NONE [1]

Substrate ____ Max 20

COMMENTS: ____

2] INSTREAM COVER (see back for instructions for additional cover scoring method)

TYPE: (Check *All* That Apply)
☒ 1 UNDERCUT BANKS [1]
☒ 1 OVERHANGING VEGETATION [1]
☒ 1 SHALLOWS (IN SLOW WATER) [1]
☒ 1 ROOTMATS [1]
☐ ___ POOLS> 70 cm [2]
☐ ___ ROOTWADS [1]
☐ ___ BOULDERS [1]
☐ ___ OXBOWS, BACKWATERS [1]
☐ ___ AQUATIC MACROPHYTES [1]
☒ 1 LOGS OR WOODY DEBRIS [1]

AMOUNT: (Check *ONLY* One or check 2 and *AVERAGE*)
☐ - EXTENSIVE > 75% [11]
☐ - MODERATE 25-75% [7]
☒ - SPARSE 5-25% [3]
☐ - NEARLY ABSENT < 5% [1]

Cover ____ Max 20

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER
☐ - HIGH [4]	☐ - EXCELLENT [7]	☐ - NONE [6]	☐ - HIGH [3]	☐ - SNAGGING ☐ - IMPOUND.
☒ - MODERATE [3]	☐ - GOOD [5]	☐ - RECOVERED [4]	☐ - MODERATE [2]	☐ - RELOCATION ☐ - ISLANDS
☒ - LOW [2]	☒ - FAIR [3]	☐ - RECOVERING [3]	☒ - LOW [1]	☒ - CANOPY REMOVAL ☐ - LEVEED
☐ - NONE [1]	☒ - POOR [1]	☒ - RECENT OR NO RECOVERY [1]		☒ - DREDGING ☒ - BANK SHAPING
				☐ - ONE SIDE CHANNEL MODIFICATIONS

Channel ____ Max 20

COMMENTS: RECENTLY IN STREAM WITH TRACK BACKHOE - REMOVED LOGJAMS & SIDE VEGETATION PHOTOS 1-3

4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH L R (Per Bank)	FLOOD PLAIN QUALITY (*PAST 100 Meter RIPARIAN*) L R (Most Predominant Per Bank)	L R	BANK EROSION L R (Per Bank)
☐ ☐ -WIDE > 50m [4]	☐ ☐-FOREST, SWAMP [3]	☐ ☐-CONSERVATION TILLAGE [1]	☐ ☐-NONE/LITTLE [3]
☐ ☒ - MODERATE 10-50m [3]	☒ ☐-SHRUB OR OLD FIELD [2]	☐ ☐ -URBAN OR INDUSTRIAL [0]	☐ ☐-MODERATE [2]
☐ ☐ -NARROW 5-10 m [2]	☒ ☒-RESIDENTIAL,PARK,NEW FIELD [1]	☐ ☐ -OPEN PASTURE,ROWCROP [0]	☒ ☒-HEAVY/SEVERE[1]
☒ ☐ - VERY NARROW <5 m[1]	☐ ☐ -FENCED PASTURE [1]	☐ ☐ -MINING/CONSTRUCTION [0]	
☒ ☒ - NONE [0]			

Riparian ____ Max 10

COMMENTS: ____

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)
☐ - >1m [6]
☐ - 0.7-1m [4]
☒ - 0.4-0.7m [2]
☐ - 0.2- 0.4m [1]
☐ - < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE)
☒ -POOL WIDTH > RIFFLE WIDTH [2]
☒ -POOL WIDTH = RIFFLE WIDTH [1]
☐ -POOL WIDTH< RIFFLE W. [0]

CURRENT VELOCITY [POOLS & RIFFLES!] (Check *All* That Apply)
☐ -EDDIES[1]
☐ -FAST[1]
☒ -MODERATE [1]
☒ -SLOW [1]
☐ -TORRENTIAL[-1]
☐ -INTERSTITIAL[-1]
☐ -INTERMITTENT[-2]

Pool/ Current ____ Max 12

COMMENTS: ____

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE DEPTH
☐ - Best Areas >10 cm [2]
☒ - Best Areas 5-10 cm[1]
☐ - *Best Areas < 5 cm* [RIFFLE=0]

RUN DEPTH
☐ - MAX > 50 [2]
☒ - MAX < 50[1]

RIFFLE/RUN SUBSTRATE
☐ -STABLE (e.g.,Cobble, Boulder) [2]
☒ -MOD. STABLE (e.g.,Large Gravel) [1]
☒ -UNSTABLE (Fine Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
☐ - NONE [2]
☐ - LOW [1]
☐ - MODERATE [0]
☒ - EXTENSIVE [-1]

☐ - NO RIFFLE [Metric=0]

Riffle/Run ____ Max 8

Gradient ____ Max 10

COMMENTS: ____

6] GRADIENT (ft/mi): 10.75 **DRAINAGE AREA** (sq.mi.): 4.2

%POOL: 50 %GLIDE: 40
%RIFFLE: 10 %RUN: ____

*Best areas must be large enough to support a population of riffle-obligate fish species.

Is Sampling Reach Representative of the Stream (Y/N) Y If Not, Explain:
RECENT CHANNEL MODIFICATION - SALEM WWTP PLANT OPERATOR HAS NOTIFIED US CORP. OF ENGINEERS - DONE FOR CITY OF SALEM

Major Suspected Sources of Impacts (Check All That Apply):
- None ☐
- Industrial ☐
- WWTP ☐
- Ag ☐
- Livestock ☐
- Silviculture ☐
- Construction ☐
- Urban Runoff ☐
- CSOs ☐
- Suburban Impacts ☐
- Mining ☐
- Channelization ☒
- Riparian Removal ☒
- Landfills ☐
- Natural ☐
- Dams ☐
- Other Flow Alteration ☐
- Other: ☐

	Gear:	Distance:	Water Clarity:	Water Stage:	Canopy -% Open
First Sampling Pass	E	0.16 KM	>55	LOW	60

Subjective Rating (1-10) ☐

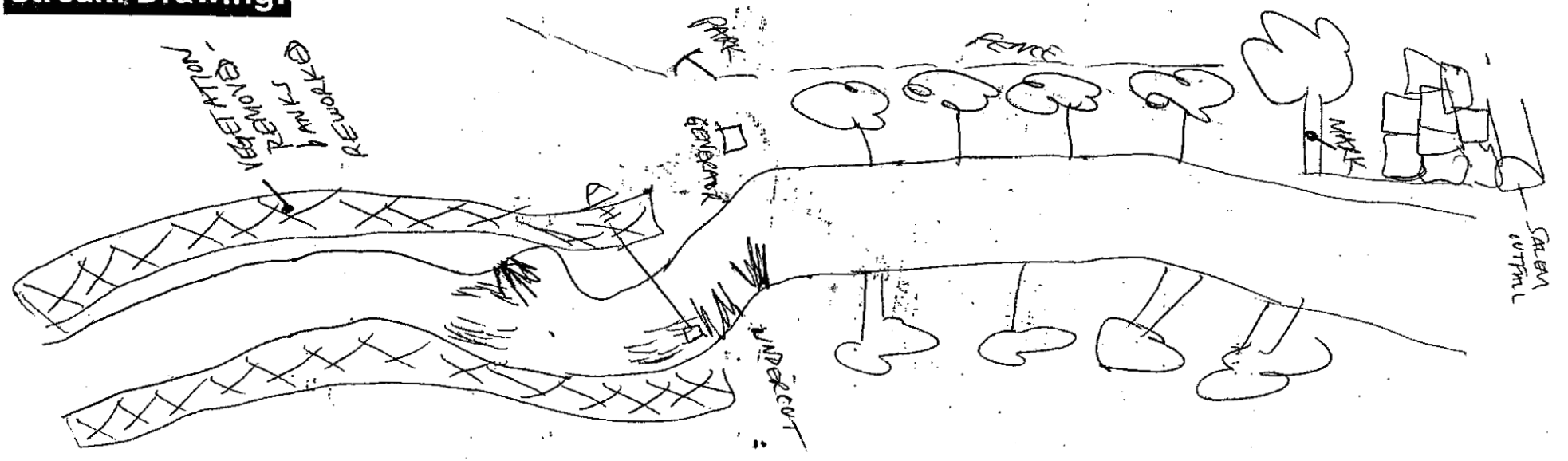
Aesthetic Rating (1-10) ☐

Gradient: ☒ - Low, ☒ - Moderate, ☐ -High

Stream Measurements:

Average Width	Average Depth	Maximum Depth	Av. Bankfull Width	Bankfull Mean Depth	W/D Ratio	Bankfull Max Depth	Floodprone Area Width	Entrench. Ratio
3-4 M	15 CM	55 CM						

Stream Drawing:



Instructions for Scoring the Alternate Cover Metric: Each Cover Type Should Receive a Score of Between 0 and 3, Where: 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

Yes	No	
☐	☒	Is Stream Ephemeral (No pools, totally dry or only damp spots)?
☒	☐	Is There Water Upstream? How Far: ____
☒	☐	Is There Water Close Downstream? How Far: ____
☒	☐	Is Dry Channel Mostly Natural?

ChicEPA Qualitative Habitat Evaluation Index Field Sheet QHEI Score: ____

River Code: 08-2 RM: 40.3 Stream M. F. BEAVER CR.
Date 071299 Location GEORGETOWN RD.
Scorers Initials: DJA Comments LAT/LONG 40 53 34 / 80 53 08.

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Estimate % present*);

TYPE	POOL	RIFFLE
☐ ☐-BLDR /SLBS[10]	___	___
☐ ☐-BOULDER [9]	✓	___
☐ ☐-COBBLE [8]	✓	___
☐ ☐-HARDPAN [4]	___	___
☐ ☐-MUCK [2]	___	___
☐ ☐-SILT [2]	✓	___
☒ ☐-GRAVEL [7]	✓	___
☒ ☐-SAND [6]	✓	___
☐ ☐-BEDROCK[5]	___	___
☐ ☐-DETRITUS[3]	___	___
☐ ☐-ARTIFICIAL[0]	___	___

NOTE: (Ignore sludge originating from point-sources; score on natural substrates)
NUMBER OF SUBSTRATE TYPES: ☒-5 or More [2] ☐-4 or Less [0]

SUBSTRATE ORIGIN: Check ONE (OR 2 & AVERAGE)
☐ -LIMESTONE [1]
☒ -TILLS [1]
☐ -WETLANDS[0]
☐ -HARDPAN [0]
☐ -SANDSTONE [0]
☐ -RIP/RAP [0]
☐ -LACUSTRINE [0]
☐ -SHALE [-1]
☐ -COAL FINES [-2]

SUBSTRATE QUALITY: Check ONE (OR 2 & AVERAGE)
SILT:
☐ -*SILT HEAVY [-2]*
☒ -SILT MODERATE [-1]
☐ -SILT NORMAL [0]
☐ -SILT FREE [1]
EMBEDDEDNESS:
☐ -EXTENSIVE [-2]
☒ -MODERATE [-1]
☐ -NORMAL [0]
☐ -NONE [1]

Substrate ____ Max 20

COMMENTS: ____

2] INSTREAM COVER (see back for instructions for additional cover scoring method)

TYPE: (Check *All* That Apply)
☐ ___UNDERCUT BANKS [1]
☒ 1 OVERHANGING VEGETATION [1]
☒ 1 SHALLOWS (IN SLOW WATER) [1]
☐ ___ROOTMATS [1]
☐ ___POOLS> 70 cm [2]
☐ ___ROOTWADS [1]
☒ 1 BOULDERS [1]
☐ ___OXBOWS, BACKWATERS [1]
☒ 1 AQUATIC MACROPHYTES [1]
☐ ___LOGS OR WOODY DEBRIS [1]

COMMENTS: ____

AMOUNT: (Check *ONLY* One or check 2 and *AVERAGE*)
☐ - EXTENSIVE > 75% [11]
☐ - MODERATE 25-75% [7]
☒ - SPARSE 5-25% [3]
☐ - NEARLY ABSENT < 5%[1]

Cover ____ Max 20

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY
☐ - HIGH [4]
☒ - MODERATE [3]
☒ - LOW [2]
☐ - NONE [1]

DEVELOPMENT
☐ - EXCELLENT [7]
☐ - GOOD [5]
☒ - FAIR [3]
☐ - POOR [1]

CHANNELIZATION
☒ - NONE [6]
☐ - RECOVERED [4]
☐ - RECOVERING [3]
☐ - RECENT OR NO RECOVERY [1]

STABILITY
☐ - HIGH [3]
☒ - MODERATE [2]
☐ - LOW [1]

MODIFICATIONS/OTHER
☐ - SNAGGING ☐ - IMPOUND.
☐ - RELOCATION ☐ - ISLANDS
☒ - CANOPY REMOVAL ☐ - LEVEED
☐ - DREDGING ☐ - BANK SHAPING
☐ - ONE SIDE CHANNEL MODIFICATIONS

Channel ____ Max 20

COMMENTS: ____

4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH (L R Per Bank)
☐ ☐ -WIDE > 50m [4]
☐ ☐ - MODERATE 10-50m [3]
☐ ☐ -NARROW 5-10 m [2]
~~☒ ☒ VERY NARROW < 5m~~[1]
☒ ☒ - NONE [0]

FLOOD PLAIN QUALITY (*PAST 100 Meter RIPARIAN*) (L R Most Predominant Per Bank)
☐ ☐-FOREST, SWAMP [3]
☐ ☐-SHRUB OR OLD FIELD [2]
☒ ☒-RESIDENTIAL,PARK,NEW FIELD [1]
☐ ☐ -FENCED PASTURE [1]

FLOOD PLAIN QUALITY (L R)
☐ ☐-CONSERVATION TILLAGE [1]
☐ ☐ -URBAN OR INDUSTRIAL [0]
☐ ☐ -OPEN PASTURE,ROWCROP [0]
☐ ☐ -MINING/CONSTRUCTION [0]

BANK EROSION (L R Per Bank)
☒ ☒-NONE/LITTLE [3]
☐ ☐ -MODERATE [2]
☐ ☐ -HEAVY/SEVERE[1]

Riparian ____ Max 10

COMMENTS: ____

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)
☐ - >1m [6]
☐ - 0.7-1m [4]
☒ - 0.4-0.7m [2]
☐ - 0.2-0.4m [1]
☐ - < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE)
☒ -POOL WIDTH > RIFFLE WIDTH [2]
☐ -POOL WIDTH = RIFFLE WIDTH [1]
☐ -POOL WIDTH< RIFFLE W. [0]

CURRENT VELOCITY [POOLS & RIFFLES!] (Check *All* That Apply)
☐ -EDDIES[1]
☐ -FAST[1]
☒ -MODERATE [1]
☒ -SLOW [1]
☐ -TORRENTIAL[-1]
☐ -INTERSTITIAL[-1]
☐ -INTERMITTENT[-2]

Pool/ Current ____ Max 12

COMMENTS: ____

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE DEPTH
☐ -*Best Areas >10 cm [2]
☒ - Best Areas 5-10 cm[1]
☐ - Best Areas < 5 cm [RIFFLE=0]

RUN DEPTH
☐ - MAX > 50 [2]
☒ - MAX < 50[1]

RIFFLE/RUN SUBSTRATE
☒-STABLE (e.g.,Cobble, Boulder) [2]
☒-MOD. STABLE (e.g.,Large Gravel) [1]
☐-UNSTABLE (Fine Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
☐ - NONE [2]
☒ - LOW [1]
☒ - MODERATE [0]
☐ - EXTENSIVE [-1]

☐ - NO RIFFLE [Metric=0]

Riffle/Run ____ Max 8

Gradient ____ Max 10

COMMENTS: ____

6] GRADIENT (ft/mi): 30.30 DRAINAGE AREA (sq.mi.): 1.7

%POOL: 30 %GLIDE: 10
%RIFFLE: 40 %RUN: 20

*Best areas must be large enough to support a population of riffle-obligate fish species.

Is Sampling Reach Representative of the Stream (Y/N) Y If Not, Explain:
COOL WATER - ARTESIAN WELL AREA

Major Suspected Sources of Impacts (Check All That Apply):
None ☐
Industrial ☐
WWTP ☐
Ag ☐
Livestock ☐
Silviculture ☐
Construction ☐
Urban Runoff ☐
CSOs ☐
Suburban Impacts ☐
Mining ☐
Channelization ☐
Riparian Removal ☒
Landfills ☐
Natural ☐
Dams ☐
Other Flow Alteration ☐
Other: ☐

	Gear:	Distance:	Water Clarity:	Water Stage:	Canopy -% Open
First Sampling Pass	E	0.15 KM	>55	LOW	90%

Subjective Rating (1-10) ☐

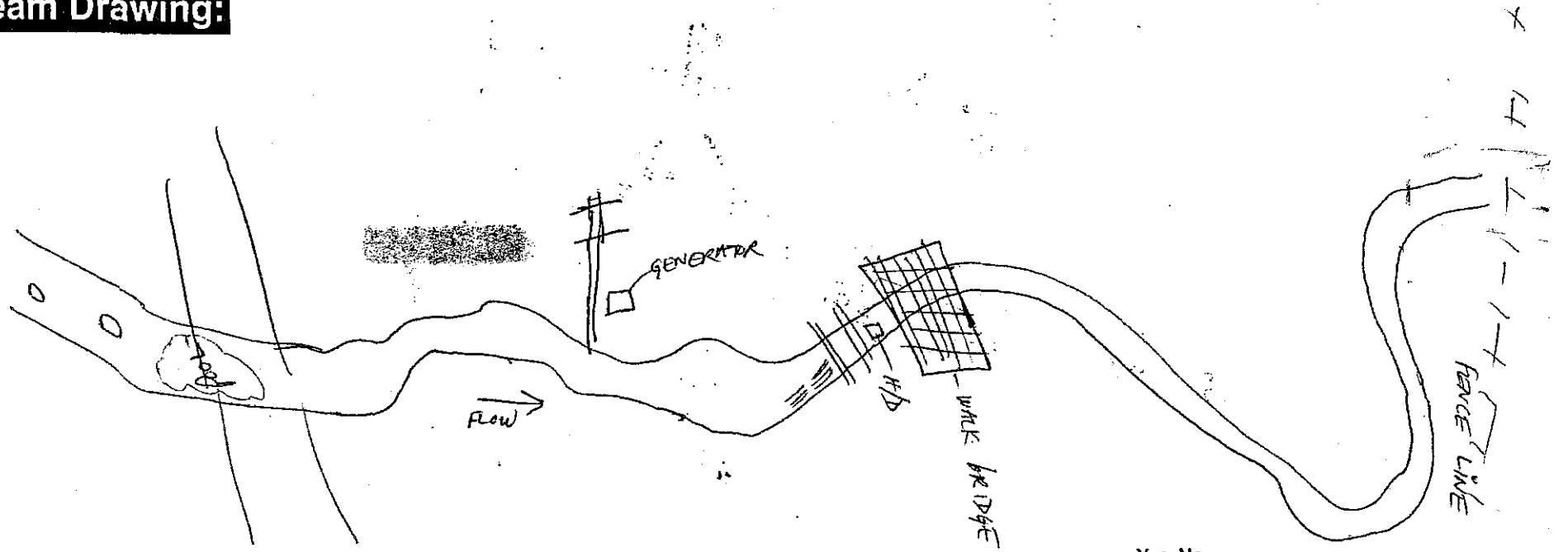
Aesthetic Rating (1-10) ☐

Gradient: ☐ - Low, ☒ - Moderate, ☐ -High

Stream Measurements:

Average Width	Average Depth	Maximum Depth	Av. Bankfull Width	Bankfull Mean Depth	W/D Ratio	Bankfull Max Depth	Floodprone Area Width	Entrench. Ratio
1.0M	20CM	55CM						

Stream Drawing:



Yes	No	
☐	☒	Is Stream Ephemeral (No pools, totally dry or only damp spots)?
☒	☐	Is There Water Upstream? How Far: ____
☒	☐	Is There Water Close Downstream? How Far: ____
☒	☐	Is Dry Channel Mostly Natural?

Instructions for Scoring the Alternate Cover Metric: Each Cover Type Should Receive a Score of Between 0 and 3, Where: 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

APPENDIX D

Analytical Laboratory Data Validation Report

1.0 INTRODUCTION

On behalf of RÜTGERS Organics Corporation, Golder Associates Inc. (Golder Associates) has validated the analytical data for the sediment, surface water and fish tissue samples collected from the Middle Fork of the Little Beaver Creek (MFLBC) from February 12 – 20, 1999. The sediment samples were analyzed for the Organic Target Compound List (TCL) Volatile Organic Compounds (VOCs), Semi-volatile Organic Compounds (SVOCs), Pesticides, Polychlorinated Biphenyls (PCBS), and the Inorganic Target Analyte List (TAL). The analyses were performed in accordance with the U.S. Environmental Protection Agency (USEPA) *Test Methods for Evaluating Solid Waste, Third Edition (SW846)*, dated December 1996. Sediment samples were also analyzed for Total Organic Carbon, grain size, and Mirex, Photomirex and Kepone (MPK) The MPK sanalyses were performed in accordance with the CAL MPK SOP (Revision 6). Surface water samples were analyzed for select water quality parameters (Total Dissolved Solids, BOD, Ammonia, Nitrate, Nitrite, Phosphorus, and Total Suspended Solids). Fish tissue samples were only analyzed forMPK. CAL performed all the analyses at the facility in State College, Pennsylvania.

Two surface water locations and five sediment locations were sampled in duplicate for field duplicate analysis and rinsate blanks and trip blanks were collected on a daily basis.

Data validation of inorganic data was performed in general accordance with the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, dated February 1994. Data validation for organic data was performed in general accordance with the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, dated February, 1994. These documents are referred to as "functional guidelines" hereafter. MPK and water quality data were validated using the method-specific criteria described in the laboratory SOPs and the individual methods.

In general, the discussions which follow in Sections 2.0 through 7.0 describe only instances where the quality control criteria specified in the documents named above were not met. Data qualifiers are defined in Table D-1. Where quality control criteria were met, positive results were deemed acceptable and no qualifiers were applied. Non-detected results were qualified with a "U" flag signifying that the result is below the quantitation limit (organics) or detection limit (inorganics). Where more than one qualifier for a sample result was warranted, the most predominant or general qualifier was applied to the results. For example, a positive result for a volatile organic compound may need to be qualified as undetected (U) due to its presence in the associated blanks; however, the initial or continuing calibration criteria for that compound may not have been met and would warrant qualification as an estimated result (J) or quantitation limit (UJ). In this particular case, the compound would be qualified as having an estimated quantitation limit (UJ). The (R) qualifier, which signifies that the result has been rejected, takes priority over all other qualifiers.

In some cases, there are multiple degrees to which the quality control criteria may not be met. For example, a matrix spike recovery for an inorganic analyte may be slightly greater than the upper limit of the Contract Required Recovery range; the corresponding positive results may be qualified as estimated (J). However, if the matrix spike recovery is significantly greater than 150%, the positive results would be qualified as unusable (R). It should be noted that the discussions contained within Sections 2.0 through 5.0 explain where quality control was deficient. As specified in the functional guidelines, if the non-adherence to quality control criteria is slight, qualification of

data may not be warranted. However, if the non-adherence is significant, qualification and possible rejection of the data may be necessary. The narrative discussion specifies where rejection of the data is necessary. Following data validation and qualification, the analytical data and qualifiers for each sample point were summarized. Qualified results are tabulated in the main body of this report.

2.0 TARGET COMPOUND LIST VOLATILE ORGANIC PARAMETERS

A total of fourteen (14) primary sediment samples were collected and submitted to CAL for analysis. Additionally, five (5) field duplicates were also collected during this sampling event. The samples were grouped into one SDG by the laboratory and analyzed for VOCs using SW846 8260. The SDG was validated in accordance with EPA Functional Guidelines for Organic Analyses as specified above.

Data Quality Objectives

Precision: Goals for laboratory and field precision were generally met, except where noted below.

Accuracy: Goals for accuracy were met for all samples, except where noted below.

Sample Result Verification: All sample results were supported in the raw data.

Detection Limits: The detection limit goals were achieved for all analyses.

Completeness: The data packages were complete for all requested analyses. A total of 19 sediment samples were validated in this data set. A total of 779 results for these samples were reported in which 779 were deemed valid. This results in a completeness of 100% for these samples.

Major Deficiencies

There were no major deficiencies identified for the VOC analyses.

Minor Deficiencies

Laboratory preparation blanks, field blanks, and trip blanks were evaluated for target compound contamination. The following compounds were detected in the blanks.

- acetone;
- chloroform;
- bromodichloromethane;
- carbon disulfide;
- 2-butanone; and,
- methylene chloride.

These contaminants were primarily associated with field activities. Laboratory pure water was not used during decontamination procedures or to generate the field blanks. For samples where the above listed compounds were detected as positive results below the Sample Quantitation Limit (SQL) and the action limit, the results were changed to the SQL and flagged as undetected (U). For samples where the listed compounds were detected as positive results above the SQL but below the action limit, the result was flagged as undetected (U) at the value reported. Samples with positive results above the action limit did not require qualification.

3.0 TARGET COMPOUND LIST SEMI-VOLATILE ORGANIC PARAMETERS

A total of fourteen (14) primary sediment samples were collected and submitted to CAL for analysis. Additionally, five (5) field duplicates were also collected during this sampling event. The samples were grouped into one SDG by the laboratory and analyzed for SVOCs using SW846 8270. The SDG was validated in accordance with EPA Functional Guidelines for Organic Analyses as specified above.

Data Quality Objectives

Precision: Goals for laboratory and field precision were generally met, except where noted below.

Accuracy: Goals for accuracy were generally met, except where noted below.

Sample Result Verification: All sample results were supported in the raw data.

Detection Limits: The detection limit goals were achieved for all analyses.

Completeness: The data packages were complete for all requested analyses. A total of 19 samples were validated in this data set. A total of 1235 results for these samples were reported in which 1235 were deemed valid. This results in a completeness of 100% for these samples.

Major Deficiencies

There were no major deficiencies identified for the SVOC analyses.

Minor Deficiencies

Bis(2-ethylhexyl)phthalate was detected in field blanks at a low concentration. Samples associated with this blank required qualification. For samples where the compound was detected as a positive result below the Sample Quantitation Limit (SQL) and the action limit, the sample result was changed to the SQL and flagged as undetected (U). For samples where the compound was detected as a positive result above the SQL but below the action limit, the result was flagged as undetected (U) at the value reported. Samples with positive results above the action limit did not require qualification. The method blanks did not contain any of the target compounds.

4.0 TARGET COMPOUND LIST PESTICIDE/PCB PARAMETERS

A total of fourteen (14) primary sediment samples were collected and submitted to CAL for analysis. Additionally, five (5) field duplicates were also collected during this sampling event. The samples were grouped into one SDG by the laboratory and analyzed for SVOCs using SW846 8081. The SDG was validated in accordance with EPA Functional Guidelines for Organic Analyses as specified above.

Data Quality Objectives

Precision: Goals for laboratory and field precision were generally met, except where noted below.

Accuracy: Goals for accuracy were generally met, except where noted below.

Sample Result Verification: All sample results were supported in the raw data.

Detection Limits: The detection limit goals were achieved for all analyses.

Completeness: The data packages were complete for all requested analyses. A total of 19 samples were validated in this data set. A total of 494 results for these samples were reported in which 494 were deemed valid. This results in a completeness of 100% for these samples.

Major Deficiencies

There were no major deficiencies identified for the Pesticide/PCB analyses.

Minor Deficiencies

There were no minor deficiencies identified for the Pesticide/PCB analyses.

5.0 MIREX, PHOTOMIREX, AND KEPONE

A total of fourteen (14) primary sediment samples were collected and submitted to CAL for analysis. Additionally, five (5) field duplicates were also collected during this sampling event. A total of eighteen (18) fish tissue samples were also collected for MPK analysis. The samples were grouped into two SDGs by the laboratory and analyzed for Mirex, Photomirex, and Kepone using the RÜTGERS Organics SOP for determination of Mirex, Photomirex, and Kepone in Solid Samples (Revision 6.0). The SDGs were validated in accordance with the laboratory SOP and USEPA Functional Guidelines for Evaluating Organic Analyses taking into account method specific criteria.

Data Quality Objectives

Precision: Goals for laboratory precision were met.

Accuracy: Goals for laboratory accuracy were met.

Sample Result Verification: All sample results were supported in the raw data.

Detection Limits: The detection limit goals were achieved for all analyses. Positive results reported below the reporting limits were qualified as estimated values.

Completeness: The data packages were complete for all requested analyses. Nineteen sediment samples and eighteen fish tissue samples were validated in this data set. A total of 81 results for these samples were reported in which 81 were deemed valid. This results in a completeness of 100% for these samples.

Major Deficiencies

There were no major deficiencies identified for MPK analyses.

Minor Deficiencies

For several samples, mirex was reported as positive hit although the ion abundance ratios for identification of the compound were not met for all ions. These data were qualified as tentatively identified (N).

6.0 TARGET ANALYTE LIST INORGANIC PARAMETERS

A total of fourteen (14) primary sediment samples were collected and submitted to CAL for analysis. Additionally, five (5) field duplicates were also collected during this sampling event. The samples were grouped into one SDG by the laboratory and analyzed for Metals using SW846 methodologies. The SDG was validated in accordance with EPA Functional Guidelines for Inorganic Analyses as specified above.

DATA QUALITY OBJECTIVES

Precision: Goals for laboratory and field precision were generally met, except where noted below.

Accuracy: Goals for accuracy were generally met, except where noted below.

Sample Result Verification: All sample results were supported in the raw data.

Detection Limits: The detection limit goals were achieved for all analysis.

Completeness: The data packages were complete for all requested analyses. Nineteen (19) samples were validated in this data set. A total of 437 results for these samples were reported in which 437 were deemed valid. This results in a completeness of 100% for these samples.

Major Deficiencies

There were no major deficiencies identified for metals analyses.

Minor Deficiencies

There were no minor deficiencies identified for metals analyses.

7.0 INDICATOR PARAMETERS

A total of fourteen (14) primary sediment samples were collected and submitted to CAL for TOC analysis. Additionally, five (5) field duplicates were also collected during this sampling event.

A total of fourteen (14) primary surface water samples were collected and submitted to CAL for TDS, BOD, TSS, Ammonia, Nitrate, Nitrite and Phosphorus analyses. Additionally, two (2) field duplicates were also collected during this sampling event.

DATA QUALITY OBJECTIVES

Precision: Goals for laboratory and field precision were generally met, except where noted below.

Accuracy: Goals for accuracy were generally met, except where noted below.

Sample Result Verification: All sample results were supported in the raw data.

Detection Limits: The detection limit goals were achieved for all analysis.

Completeness: The data packages were complete for all requested analyses. Nineteen (19) sediment samples and sixteen (16) surface water samples were validated in this data set. A total of 131 results for these samples were reported in which 131 were deemed valid. This results in a completeness of 100% for these samples.

Major Deficiencies

There were no major deficiencies identified for indicator analyses.

Minor Deficiencies

There were no minor deficiencies identified for indicator analyses.

8.0 SUMMARY

Validation of the data collected for the MFLBC Impact Assesment was performed in accordance with National Functional Validation Guidelines, as applicable, and the criteria specified by the analytical methodologies and the CAL SOPs

Overall, the data required qualification due to some quality control criteria that were not achieved, but the majority of the data may be deemed usable in terms of objectives of the Work Plan. Although a positive result was qualified as estimated, the analyte should be considered present. Similarly, a non-detected result that was qualified as an estimated quantitation/detection limit should be considered not present for the purposes of this study, although the limit itself may not be precise. No data were rejected for this sampling event.

g:\projects\933-6154\mflbciar\narr.doc

TABLE D-1

Data Qualifiers

U - The analyte was tested for but was not detected. The associated numerical value is either the sample quantitation limit (organics) or the sample detection limit (inorganics).

B - The analyte was detected at a concentration which is between the Instrument Detection Limit (IDL) and the Contract Required Detection Limit (CRDL). The data is acceptable.

R - Reject data due to quality control criteria. The data are unusable (analyte may or may not be present in the sample).

N - Tentative identification; consider analyte present.

J - The analyte is present. The associated numerical value is an estimated quantity and may not be accurate or precise.

UJ - The analyte was tested for but not detected. The sample quantitation limit or the sample detection limit is estimated and may be inaccurate or imprecise.